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Report 30, April-June 1982

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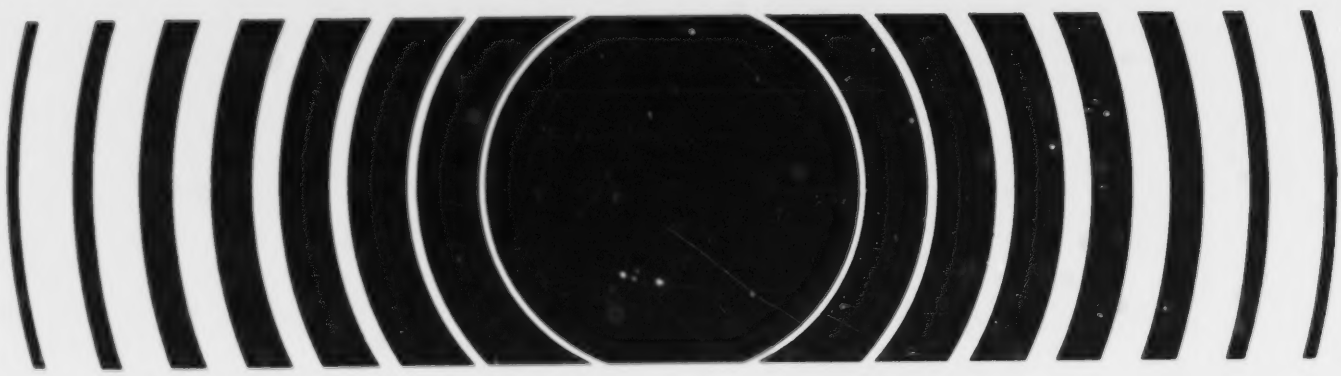

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This quarterly report contains data from the Environmental Radiation Ambient Monitoring System (ERAMS), and similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (ERD) when available.

The ERAMS is comprised of nationwide sampling stations that provide air, surface, and drinking water and milk samples from which environmental radiation levels are derived. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for Lission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and trituim.

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E N V I R O N M E N T A L

R A D I A T I O N

D A T A

REPORT 30

(April - June 1982)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Radiation Programs

Preface

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama. Data from the Environmental Radiation Ambient Monitoring System (ERAMS), and similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (ERD) when available.

ERAMS was established in 1973 by the U. S. Environmental Protection Agency's Office of Radiation Programs (ORP). The ERAMS is comprised of nationwide sampling stations that provide air, surface, and drinking water and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

1. Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the environment.

2. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and tritium. This monitoring effort also serves to provide ancillary information on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants and natural background levels.

E N V I R O N M E N T A L R A D I A T I O N

D A T A

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DATA - Reporting Rationale and Procedures

The intent of EPA's Office of Radiation Programs in establishing the Environmental Radiation Ambient Monitoring System was to provide continuous, accurate and usable environmental radiation data for the public. Therefore, new data reporting procedures were developed to allow better interpretation of the data. The most significant change in this reporting procedure is that all specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive.

Reporting Rationale

Frequently, concentrations of a radionuclide in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. Prior to July 1975, ERAMS data were not reported numerically when the results were less than a specified reporting level or minimum detectable level. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach will facilitate estimates of bias in the nuclide analyses and will allow better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value does not have physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of several measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

(1) Reported Values

Specific Analyses - All specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive. Numerical values given are as of sample collection date.

Gross Analyses - The actual value of gross radioactivity measurements will be reported, unless the value is below the minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level will be reported.

MDL is defined as the 3 sigma error of the background. A tabulation of MDL's is given in the following table.

(2) Reported Error Terms

Each reported value for specific analyses will be accompanied by a counting error term at the 2 sigma (95%) confidence interval. Potassium concentrations are determined by specific activity analyses. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

(3) Significant Figures

All reported values will be rounded to no more than three significant figures. The last significant figure will be increased by one if the figure following is five or greater, otherwise it is left unchanged.

(4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in table 1. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

(5) Averages

Averages will be calculated along with appropriate error terms in an annual summary and analysis of ERAMS data. In calculating these averages, all values of individual data including negative numbers will be utilized. Averages will not be included in ERD quarterly reports.

TABLE 1

ERAMS Reporting Increments and Minimum Detectable Levels

for Radionuclide Analyses

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m^3	.01 pCi/m^3	.01 pCi/m^3
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m^2	.01 nCi/m^2	.01 $nCi/m^{2(a)}$
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Carbon-14	Milk	pCi/l	1 pCi/l	15 pCi/l
Krypton-85	Ambient Air	pCi/m^3	.1 pCi/m^3	2 pCi/m^3
Plutonium-238, 239	Air	aCi/m^3	.1 aCi/m^3	.015 $pCi^{(b)}$ per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m^3	.1 aCi/m^3	.015 $pCi^{(b)}$ per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l(c)
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
Iodine-129	Milk	fCi/l	.1 fCi/l	.4 fCi/l
Iodine-127	Milk	g/l	10 g/l	10 g/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
Potassium	Milk	g/l	.1 g/l	.12 g/l
	Water	g/l	.1 g/l	.12 g/l
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

(a) The value in terms of nCi/m^2 would be dependent on precipitation (mm).
(b) This value in terms of pCi/m^3 would be dependent on the air volume.
(c) Activity as of the day of counting.

ENVIRONMENTAL RADIATION AMBIENT MONITORING SYSTEM (ERAMS)

SECTION I. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located throughout the United States, Virgin Islands, and the Panama Canal.

Filters (10-cm diameter synthetic fiber) from air samplers are changed twice weekly and field measurements are made with a G-M survey meter at 5 hours and 29 hours after collection to allow for radon and thoron daughter product decay. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to EERF for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing laboratory gross beta counts greater than 1 pCi/m^3. The lower gross beta values reported for laboratory measurements are largely due to the decay of radionuclides which occurred between the times of the field estimates and laboratory measurements.

Precipitation samples are collected at the field stations where air filters are collected. These samples are also sent to EERF where they are composited monthly for tritium, gross beta activity measurements and gamma scans.

These locations also correspond to airborne particulate and drinking water sampling locations selected for plutonium analyses. Plutonium-238, -239, and uranium-234, -235, and -238 analyses are performed annually on precipitation samples collected during March - May.

Tables 2 - 4 present the monthly average gross beta concentrations in airborne particulates for April - June 1982.

Tables 5 - 7 present the monthly average gross beta concentration and any specific gamma concentrations for precipitation samples for April - June 1982 A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36193.

The tritium in precipitation samples for April - June 1982 at the selected stations are shown in Table 8.

TABLE 2

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
APRIL 1982

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	0.6	0.1	0.2	0.01	0.01	0.01
CA:LOS ANGELES	9	1.1	0.0	0.3	0.04	0.01	0.02
CT:HARTFORD	9	0.2	0.1	0.1	0.02	0.01	0.01
DE:WILMINGTON	8	0.2	0.0	0.1	0.02	0.01	0.01
FL:JACKSONVILLE	8	0.1	0.0	0.1	0.02	0.01	0.01
FL:MIAMI	8	0.1	0.0	0.0	0.02	0.00	0.01
HI:HONOLULU	9	0.2	0.0	0.1	0.01	0.01	0.01
IA:IOWA CITY	9	1.5	0.0	0.6	0.02	0.01	0.02
ID:BOISE	9	0.4	0.1	0.2	0.02	0.01	0.01
ID:IDAHO FALLS	9	NM	NM	NM	0.02	0.01	0.01
IL:CHICAGO	8	0.8	0.1	0.3	0.03	0.01	0.02
KS:TOPEKA	9	2.4	0.3	0.9	0.02	0.01	0.01
ME:AUGUSTA	9	0.2	0.0	0.1	0.02	0.01	0.02
MI:LANSING	9	0.8	0.1	0.3	0.09	0.03	0.04
MN:MINNEAPOLIS	9	1.0	0.1	0.3	0.04	0.01	0.02
MO:JEFFERSON CITY	9	1.6	0.2	0.6	0.04	0.01	0.02
MS:JACKSON	9	0.5	0.1	0.2	0.04	0.01	0.02
ND:BISMARCK	9	0.5	0.0	0.3	0.02	0.01	0.02
NH:CONCORD	4	2.1	0.6	1.0	0.01	0.01	0.01
NJ:TRENTON	9	0.8	0.0	0.2	0.02	0.01	0.01
NV:LAS VEGAS	9	0.7	0.2	0.5	0.02	0.01	0.01
NY:ALBANY	9	0.4	0.0	0.1	0.03	0.01	0.02
NY:NEW YORK CITY	10	0.1	0.1	0.1	0.03	0.01	0.02
NY:NIAGARA FALLS	8	0.5	0.1	0.2	0.02	0.01	0.02
NY:SYRACUSE	8	0.4	0.0	0.1	0.03	0.01	0.02
OH:COLUMBUS	9	0.7	0.1	0.3	0.04	0.02	0.02
OH:PAINESVILLE	9	0.3	0.1	0.2	0.03	0.01	0.02
OH:TOLEDO	9	1.0	0.1	0.3	0.03	0.01	0.02
OR:PORTLAND	9	NM	NM	NM	0.01	0.00	0.01
PA:HARRISBURG	12	0.7	0.1	0.3	0.03	0.01	0.02
PA:PITTSBURGH	9	0.7	0.2	0.4	0.02	0.01	0.02
RI:PROVIDENCE	9	1.3	0.1	0.3	0.03	0.01	0.02
SC:BARNWELL	3	0.1	0.0	0.0	0.01	0.00	0.01
SC:COLUMBIA	9	0.8	0.1	0.3	0.03	0.02	0.02
SD:PIERRE	9	1.3	0.2	0.6	0.03	0.01	0.02
TX:AUSTIN	9	1.7	0.5	1.0	0.03	0.01	0.02
TX:EL PASO	9	1.1	0.0	0.6	0.03	0.01	0.02
VA:LYNCHBURG	9	0.6	0.1	0.2	0.02	0.01	0.01
WA:SEATTLE	8	0.1	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	9	0.4	0.1	0.3	0.02	0.01	0.01
WI:MADISON	7	0.9	0.0	0.3	0.04	0.01	0.02
WV:CHARLESTON	9	1.0	0.2	0.5	0.02	0.01	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
MAY 1982

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	1.2	0.3	0.7	0.02	0.01	0.01
CA:BERKELEY	8	0.1	0.0	0.1	0.02	0.00	0.01
CA:LOS ANGELES	8	0.3	0.0	0.2	0.02	0.01	0.01
CT:HARTFORD	8	0.2	0.1	0.2	0.02	0.01	0.01
DE:WILMINGTON	8	0.3	0.0	0.1	0.02	0.01	0.01
FL:JACKSONVILLE	8	0.4	0.0	0.2	0.02	0.01	0.01
FL:MIAMI	7	0.1	0.0	0.1	0.02	0.01	0.01
HI:HONOLULU	7	0.1	0.1	0.1	0.02	0.01	0.01
IA:IOWA CITY	8	1.5	0.3	0.8	0.02	0.01	0.01
ID:BOISE	7	0.6	0.0	0.3	0.02	0.01	0.01
ID:IDAHO FALLS	8	NM	NM	NM	0.03	0.01	0.01
IL:CHICAGO	7	1.2	0.1	0.5	0.07	0.01	0.03
KS:TOPEKA	8	0.9	0.2	0.4	0.01	0.00	0.01
ME:AUGUSTA	8	0.5	0.1	0.3	0.02	0.00	0.01
MI:LANSING	8	1.0	0.2	0.6	0.06	0.01	0.03
MN:MINNEAPOLIS	8	1.2	0.1	0.3	0.04	0.01	0.02
MO:JEFFERSON CITY	8	1.1	0.1	0.4	0.03	0.01	0.02
MS:JACKSON	9	0.4	0.2	0.3	0.04	0.01	0.03
NC:CHARLOTTE	1	0.3	0.1	0.1	0.01	0.01	0.01
ND:BISMARCK	8	1.4	0.2	0.5	0.02	0.01	0.01
NH:CONCORD	8	1.6	0.3	1.1	0.01	0.00	0.01
NJ:TRENTON	7	0.5	0.2	0.3	0.01	0.01	0.01
NV:LAS VEGAS	8	0.9	0.0	0.5	0.03	0.01	0.02
NY:ALBANY	8	0.7	0.0	0.2	0.02	0.01	0.01
NY:NEW YORK CITY	8	0.2	0.1	0.2	0.02	0.01	0.01
NY:NIAGARA FALLS	8	0.7	0.2	0.4	0.02	0.01	0.01
NY:SYRACUSE	8	0.7	0.2	0.4	0.03	0.01	0.01
OH:COLUMBUS	8	2.0	0.3	1.0	0.04	0.01	0.03
OH:PAINESVILLE	8	0.7	0.2	0.4	0.02	0.01	0.01
OH:TOLEDO	7	2.0	0.1	0.6	0.02	0.01	0.02
OK:OKLAHOMA CITY	7	0.3	0.0	0.2	0.02	0.00	0.01
OR:PORTLAND	8	NM	NM	NM	0.01	0.00	0.01
PA:HARRISBURG	12	1.7	0.2	0.7	0.02	0.01	0.02
PA:PITTSBURGH	8	0.8	0.2	0.6	0.04	0.01	0.02
RI:PROVIDENCE	7	0.5	0.1	0.3	0.02	0.01	0.01
SC:BARNWELL	2	NM	NM	NM	0.02	0.00	0.01
SC:COLUMBIA	8	1.1	0.2	0.6	0.05	0.01	0.03
SD:PIERRE	9	1.3	0.0	0.5	0.03	0.00	0.01
TX:AUSTIN	8	1.3	0.2	0.7	0.05	0.01	0.02
TX:EL PASO	8	0.8	0.5	0.6	0.03	0.01	0.02
VA:LYNCHBURG	8	1.2	0.0	0.4	0.03	0.00	0.02
WA:SEATTLE	6	0.1	0.0	0.1	0.01	0.00	0.00
WA:SPOKANE	8	0.6	0.2	0.4	0.02	0.01	0.01
WI:MADISON	8	0.9	0.2	0.4	0.02	0.01	0.01
WV:CHARLESTON	6	1.2	0.2	0.7	0.03	0.01	0.02
WY:CHEYENNE	1	1.9	0.8	1.9	0.02	0.02	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JUNE 1982

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.6	0.1	0.7	0.02	0.01	0.01
CA:BERKELEY	9	0.1	0.0	0.0	0.01	0.00	0.01
CA:LOS ANGELES	9	0.5	0.0	0.2	0.01	0.01	0.01
CT:HARTFORD	9	0.2	0.1	0.1	0.01	0.00	0.01
DE:WILMINGTON	9	1.4	0.0	0.2	0.01	0.00	0.01
FL:JACKSONVILLE	8	0.2	0.0	0.1	0.02	0.01	0.01
FL:MIAMI	9	0.1	0.0	0.0	0.02	0.01	0.01
HI:HONOLULU	9	0.3	0.1	0.2	0.01	0.00	0.01
IA:IOWA CITY	9	0.9	0.1	0.5	0.02	0.01	0.01
ID:BOISE	9	0.8	0.1	0.4	0.02	0.01	0.01
ID:IDAHO FALLS	9	NM	NM	NM	0.02	0.01	0.01
IL:CHICAGO	7	1.0	0.1	0.4	0.04	0.01	0.02
KS:TOPEKA	9	0.4	0.0	0.2	0.01	0.00	0.00
ME:AUGUSTA	9	0.4	0.1	0.2	0.01	0.01	0.01
MI:LANSING	9	1.0	0.0	0.3	0.05	0.01	0.03
MN:MINNEAPOLIS	9	0.3	0.1	0.2	0.03	0.01	0.01
MO:JEFFERSON CITY	9	0.7	0.1	0.3	0.05	0.01	0.02
MS:JACKSON	8	1.0	0.1	0.4	0.04	0.01	0.02
ND:BISMARCK	9	0.5	0.2	0.3	0.04	0.01	0.02
NH:CONCORD	9	3.2	0.5	1.5	0.02	0.00	0.01
NJ:TRENTON	9	0.3	0.0	0.2	0.01	0.01	0.01
NV:LAS VEGAS	9	3.0	0.4	0.9	0.02	0.01	0.02
NY:ALBANY	9	0.7	0.0	0.2	0.02	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.2	0.1	0.1	0.01	0.01	0.01
NY:SYRACUSE	9	0.2	0.1	0.1	0.02	0.01	0.01
OH:COLUMBUS	9	0.6	0.1	0.3	0.02	0.01	0.01
OH:PAINESVILLE	9	0.3	0.1	0.2	0.01	0.01	0.01
OH:TOLEDO	8	1.2	0.2	0.6	0.03	0.00	0.01
OK:OKLAHOMA CITY	9	0.6	0.1	0.3	0.02	0.01	0.01
OR:PORTLAND	9	NM	NM	NM	0.01	0.00	0.01
PA:HARRISBURG	12	1.1	0.1	0.5	0.02	0.01	0.01
PA:PITTSBURGH	9	0.6	0.1	0.3	0.02	0.00	0.01
RI:PROVIDENCE	8	0.3	0.1	0.1	0.01	0.01	0.01
SC:BARNWELL	1	0.3	0.0	0.0	0.02	0.01	0.01
SC:COLUMBIA	9	0.7	0.2	0.4	0.04	0.01	0.02
SD:PIERRE	8	1.0	0.1	0.5	0.03	0.01	0.02
TX:AUSTIN	9	1.6	0.6	1.1	0.05	0.01	0.02
TX:EL PASO	7	1.2	0.4	0.6	0.02	0.01	0.02
VA:LYNCHBURG	9	0.9	0.1	0.4	0.02	0.00	0.01
WA:SEATTLE	9	0.1	0.0	0.1	0.01	0.00	0.01
WA:SPOKANE	10	0.7	0.2	0.4	0.02	0.01	0.02
WI:MADISON	9	1.0	0.1	0.4	0.02	0.00	0.01
WV:CHARLESTON	2	0.3	0.3	0.3	0.01	0.01	0.01
WY:CHEYENNE	1	2.7	0.3	2.7	0.02	0.01	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 5

GROSS BETA CONCENTRATION IN PRECIPITATION

APRIL 1982

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	182.1	0.46	0.11	ND
CA:BERKELEY	38.4	0.02	0.02	ND
CA:LOS ANGELES	41.3	0.09	0.02	ND
CO:DENVER	9.3	0.10	0.01	ND
CT:HARTFORD	37.3	0.12	0.02	ND
FL:JACKSONVILLE	60.5	0.14	0.03	ND
ID:BOISE	25.8	0.04	0.01	ND
ID:IDAHO FALLS	51.8	0.13	0.03	ND
IL:CHICAGO	35.4	0.05	0.02	ND
MI:LANSING	30.3	0.05	0.02	ND
MS:JACKSON	9.4	0.02	0.01	ND
ND:BISMARCK	19.6	0.03	0.01	ND
NJ:TRENTON	92.2	0.13	0.04	ND
NY:NEW YORK CITY	4.4	0.01	0.00	ND
NY:NIAGARA FALLS	26.8	0.26	0.03	ND
OH:PAINESVILLE	46.3	0.07	0.03	ND
OR:PORTLAND	135.0	0.21	0.07	ND
PA:HARRISBURG	53.6	0.06	0.03	ND
SC:BARNWELL	50.0	0.19	0.04	ND
SC:COLUMBIA	105.3	0.18	0.05	ND
TX:AUSTIN	10.6	0.02	0.01	ND
VA:LYNCHBURG	78.8	0.35	0.06	ND
WV:CHARLESTON	12.5	0.07	0.01	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

MAY 1982

LOCATION	DEPTH	ACT. ± 2s		SPECIFIC GAMMA ACT.
	(mm)	(nCi/m^2)		(pCi/l)
AL:MONTGOMERY	42.3	0.29	0.04	ND
CO:DENVER	83.5	0.19	0.05	ND
CT:HARTFORD	5.0	0.03	0.00	ND
FL:JACKSONVILLE	88.8	0.55	0.07	ND
ID:BOISE	10.0	0.02	0.00	ND
IL:CHICAGO	32.3	0.06	0.02	ND
MI:LANSING	37.8	0.11	0.02	ND
ND:BISMARCK	98.6	0.21	0.06	ND
NJ:TRENTON	15.9	0.09	0.01	ND
NY:NEW YORK CITY	12.9	0.07	0.01	ND
NY:NIAGARA FALLS	66.5	0.11	0.04	ND
OH:COLUMBUS	45.5	0.11	0.03	ND
OH:PAINESVILLE	40.0	0.11	0.02	ND
OR:PORTLAND	17.0	0.13	0.02	ND
PA:HARRISBURG	94.2	0.32	0.06	ND
PA:PITTSBURGH	88.8	0.81	0.09	ND
SC:BARNWELL	50.0	0.16	0.03	ND
SC:COLUMBIA	22.5	0.07	0.01	ND
TX:AUSTIN	8.1	0.01	0.00	ND
VA:LYNCHBURG	29.5	0.62	0.04	ND
WV:CHARLESTON	10.0	0.02	0.01	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 7

GROSS BETA CONCENTRATION IN PRECIPITATION

JUNE 1982

LOCATION	DEPTH	ACT. ± 2s		SPECIFIC GAMMA ACT.
	(mm)	(nCi/m^2)		(pCi/l)
AL:MONTGOMERY	56.9	0.15	0.03	ND
CT:HARTFORD	81.5	0.12	0.04	ND
FL:JACKSONVILLE	121.9	0.24	0.06	ND
ID:BOISE	10.4	0.10	0.01	ND
ID:IDAHO FALLS	47.0	0.07	0.02	ND
IL:CHICAGO	24.7	0.05	0.01	ND
MI:LANSING	91.1	0.13	0.04	ND
MS:JACKSON	3.0	0.01	0.00	ND
ND:BISMARCK	74.0	0.23	0.05	ND
NJ:TRENTON	67.7	0.12	0.03	ND
NY:NEW YORK CITY	40.0	0.03	0.02	ND
NY:NIAGARA FALLS	67.9	0.07	0.04	ND
OH:COLUMBUS	52.3	0.07	0.03	ND
OH:PAINESVILLE	100.0	0.13	0.05	ND
OR:PORTLAND	22.0	0.09	0.02	ND
PA:HARRISBURG	103.3	0.08	0.05	ND
SC:BARNWELL	107.5	0.14	0.05	ND
SC:COLUMBIA	162.5	0.24	0.08	ND
TX:AUSTIN	3.3	0.01	0.00	ND
VA:LYNCHBURG	19.7	0.06	0.01	ND
WV:CHARLESTON	120.0	0.10	0.05	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

APRIL - JUNE 1982

LOCATION	APRIL nCi/l ± 2s	MAY nCi/l ± 2s	JUNE nCi/l ± 2s
AL:MONTGOMERY	0.2 0.2	0.2 0.2	0.2 0.2
CA:BERKELEY	0.2 0.2	NS	NS
CA:LOS ANGELES	0.3 0.2	NS	NS
CO:DENVER	0.3 0.2	0.3 0.2	NS
CT:HARTFORD	0.3 0.2	0.4 0.2	0.4 0.2
FL:JACKSONVILLE	0.3 0.2	0.1 0.2	0.1 0.2
ID:BOISE	0.2 0.2	0.3 0.2	0.3 0.2
ID:IDAHO FALLS	0.3 0.2	0.3 0.2	NS
IL:CHICAGO	0.2 0.2	0.3 0.2	0.2 0.2
MI:LANSING	0.2 0.2	0.2 0.2	0.1 0.2
MS:JACKSON	0.2 0.2	NS	0.2 0.2
ND:BISMARCK	0.3 0.2	0.2 0.2	0.3 0.2
NJ:TRENTON	0.2 0.2	0.3 0.2	0.2 0.2
NY:NEW YORK CITY	0.2 0.2	0.3 0.2	0.3 0.2
NY:NIAGARA FALLS	0.3 0.2	0.3 0.2	0.2 0.2
OH:COLUMBUS	NS	0.2 0.2	0.2 0.2
OH:PAINESVILLE	0.3 0.2	0.2 0.2	0.2 0.2
OR:PORTLAND	0.2 0.2	0.3 0.2	0.3 0.2
PA:HARRISBURG	0.3 0.2	0.3 0.2	0.3 0.2
PA:PITTSBURGH	NS	0.4 0.2	NS
SC:BARNWELL	1.3 0.2	0.7 0.2	1.1 0.2
SC:COLUMBIA	0.3 0.2	0.5 0.2	0.8 0.2
TX:AUSTIN	0.2 0.2	0.2 0.2	0.2 0.2
VA:LYNCHBURG	0.3 0.2	0.4 0.2	0.2 0.2
WV:CHARLESTON	0.3 0.2	0.3 0.2	0.2 0.2

NS NO SAMPLE
s SIGMA COUNTING ERROR

Plutonium and Uranium in Airborne Particulates

Environmental radiation levels of plutonium and uranium are determined by the analyses of quarterly composite samples (air filters) collected from the continuously operating airborne particulate samplers. The number of continuously operating stations is being increased from the original 22 will eventually number 67 when all equipment is operational.

Analyses of the composited filters consist of ashing, separating by liquid ion exchange, and coprecipitation of the plutonium or uranium.

Concentration of the specific isotopes of plutonium-238, -239, and uranium-234, -235, and -238 are determined by alpha spectroscopy. The volume of air analyzed normally ranges from 25,000 to 40,000 m^3 for each quarterly composite.

Plutonium and uranium in airborne particulates data for January - March 1982 are shown for the 42 stations operating during this period in Table 9.

The plutonium and uranium analyses in precipitation for 1982 are shown in Table 10.

TABLE 9

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
JANUARY - MARCH 1982 COMPOSITES

LOCATION	^{238}Pu aCi/m^3 ± 2s		^{239}Pu aCi/m^3 ± 2s		^{234}U aCi/m^3 ± 2s		^{235}U aCi/m^3 ± 2s		^{238}U aCi/m^3 ± 2s	
AL:MONTGOMERY	0.8	0.5	2.5	0.8	9.4	2.0	0.9	0.5	8.9	1.9
CA:LOS ANGELES	0.0	0.4	4.2	1.1	19.8	3.6	0.9	0.5	18.8	3.5
CT:HARTFORD	0.5	0.5	3.8	1.3	21.7	4.1	1.5	0.8	21.1	4.0
FL:JACKSONVILLE	-0.1	0.5	2.2	1.0	20.3	3.4	1.1	0.6	18.4	3.2
FL:MIAMI	0.6	0.6	4.9	1.3	22.6	4.6	0.9	0.6	14.2	3.3
ID:BOISE	0.2	0.4	3.0	0.9	12.9	2.5	0.6	0.4	13.7	2.6
ID:IDAHO FALLS	1.3	1.5	3.4	1.5	30.4	6.4	0.8	0.7	25.8	5.6
IL:CHICAGO	-0.1	0.5	3.2	0.9	29.5	5.3	0.5	0.4	25.8	4.7
KS:TOPEKA	0.3	0.2	5.0	1.0	17.3	3.2	0.6	0.4	12.7	2.5
ME:AUGUSTA	0.4	0.9	3.6	1.5	41.8	8.4	0.9	0.8	33.3	7.0
MI:LANSING	0.9	0.8	6.3	1.7	35.7	6.8	0.9	0.9	37.7	7.1
MN:MINNEAPOLIS	0.4	0.5	3.2	0.9	34.7	5.4	2.3	0.8	33.2	5.1
MO:JEFFERSON CITY	0.0	0.4	4.0	1.1	23.1	3.8	1.8	0.8	23.8	3.9
MS:JACKSON	0.7	0.7	3.1	0.9	22.1	4.1	1.0	0.6	18.5	3.6
ND:BISMARCK	1.7	1.1	3.0	1.3	28.9	5.8	0.2	0.6	26.6	5.5
NJ:TRENTON	0.5	1.6	3.3	1.9	15.9	4.1	0.6	0.6	14.8	3.9
NV:LAS VEGAS	0.7	0.7	6.3	1.9	95.8	14.7	1.9	1.1	49.9	8.5
NY:ALBANY	-0.1	0.9	4.5	1.6	44.3	7.3	3.1	1.3	41.3	6.8
NY:NEW YORK CITY	-0.1	0.6	3.2	1.2	21.1	3.5	0.6	0.4	19.3	3.3
NY:NIAGARA FALLS	0.1	0.7	1.7	0.8	39.5	6.0	1.7	0.7	33.9	5.3
NY:SYRACUSE	0.3	0.9	3.9	1.5	33.8	6.0	1.3	0.8	27.3	5.1
OH:COLUMBUS	0.2	0.5	2.6	0.9	44.6	6.7	2.1	0.8	38.6	5.9
OH:PAINESVILLE	0.4	0.4	2.6	0.9	38.7	6.1	0.9	0.5	33.5	5.4
OH:TOLEDO	0.2	0.4	2.3	0.8	27.7	4.7	1.2	0.6	24.6	4.3
OR:PORTLAND	-0.1	0.5	1.8	0.8	14.1	2.5	0.4	0.3	11.8	2.2
PA:HARRISBURG	4.7	1.6	1.7	0.9	22.1	3.6	0.8	0.5	17.1	3.0
PA:PITTSBURGH	0.4	0.7	2.5	1.1	45.2	7.4	0.4	0.6	42.9	7.1
RI:PROVIDENCE	0.1	0.4	2.6	0.9	17.7	3.4	0.2	0.2	19.0	3.6
SC:BARNWELL	0.7	0.8	5.0	1.4	16.9	3.6	1.0	0.9	12.8	3.0
SC:COLUMBIA	0.6	0.5	3.3	1.0	29.4	4.9	1.2	0.7	23.8	4.2
SD:PIERRE	1.9	1.3	4.0	1.9	25.9	5.8	1.4	1.0	26.0	5.8
TX:EL PASO	0.2	1.6	4.0	2.1	84.6	17.9	1.2	1.4	77.0	16.5
VA:LYNCHBURG	0.2	0.5	4.3	1.2	133.2	18.5	3.5	1.0	13.5	2.5
WA:SEATTLE	0.7	0.8	3.0	1.1	8.2	1.8	0.3	0.4	7.4	1.7
WA:SPOKANE	0.4	0.4	2.5	0.9	15.8	3.3	0.6	0.5	13.2	2.9
WI:MADISON	0.1	0.6	2.5	0.9	18.7	3.3	0.6	0.4	17.5	3.1
WV:CHARLESTON	0.3	0.6	3.3	1.2	34.8	5.8	1.7	0.9	34.0	5.7

THE ^{238}Pu AND ^{239}Pu CONCENTRATIONS REPORTED IN THIS TABLE HAVE BEEN ROUNDED.

s SIGMA COUNTING ERROR

TABLE 10

PLUTONIUM AND URANIUM ANALYSES
OF
SELECTED PRECIPITATION COMPOSITE SAMPLES

1982

LOCATION	^{238}Pu pCi/l ± 2s		^{239}Pu pCi/l ± 2s		^{234}U pCi/l ± 2s		^{235}U pCi/l ± 2s		^{238}U pCi/l ± 2s	
AL:MONTGOMERY	0.007	0.008	0.000	0.002	0.005	0.006	0.000	0.001	0.011	0.007
CA:BERKELEY	0.002	0.007	0.007	0.005	0.010	0.007	0.002	0.003	0.014	0.008
CA:LOS ANGELES	0.007	0.009	0.000	0.003	0.017	0.009	0.000	0.001	0.011	0.007
CO:DENVER	0.003	0.007	0.002	0.003	0.031	0.014	-0.001	0.003	0.027	0.012
CT:HARTFORD	0.008	0.010	-0.006	0.012	0.028	0.016	0.002	0.006	0.021	0.014
FL:JACKSONVILLE	0.006	0.006	0.003	0.004	0.016	0.010	0.002	0.003	0.019	0.011
ID:BOISE	0.005	0.008	0.004	0.004	0.034	0.013	0.004	0.004	0.021	0.010
ID:IDAHO FALLS	-.002	0.010	-0.003	0.005	0.039	0.017	0.003	0.004	0.012	0.009
IL:CHICAGO	0.009	0.008	0.001	0.001	0.014	0.008	0.000	0.000	0.010	0.006
MI:LANSING	0.001	0.006	0.001	0.002	0.012	0.009	0.002	0.003	0.010	0.008
MS:JACKSON	-.002	0.006	0.002	0.003	0.009	0.007	0.001	0.002	0.020	0.010
ND:BISMARCK	0.003	0.005	0.000	0.001	0.008	0.007	-0.002	0.003	0.007	0.007
NJ:TRENTON	-.001	0.004	0.001	0.003	0.019	0.009	0.001	0.002	0.017	0.010
NY:NEW YORK CITY	0.004	0.010	0.001	0.002	0.022	0.012	0.002	0.004	0.015	0.009
NY:NIAGARA FALLS	0.001	0.006	0.002	0.008	0.015	0.011	-0.003	0.006	0.011	0.010
OH:COLUMBUS	0.002	0.004	0.000	0.000	0.013	0.007	0.005	0.005	0.011	0.007
OH:PAINESVILLE	0.008	0.009	0.000	0.000	0.032	0.016	0.002	0.004	0.004	0.007
OR:PORTLAND	-.003	0.010	0.002	0.003	0.018	0.010	0.006	0.005	0.008	0.006
PA:HARRISBURG	0.006	0.010	0.000	0.000	0.041	0.016	0.013	0.009	0.013	0.010
PA:PITTSBURGH	-.001	0.005	0.006	0.006	0.096	0.024	0.001	0.002	0.056	0.017
SC:BARNWELL	0.003	0.004	0.004	0.004	0.014	0.008	0.001	0.002	0.012	0.007
SC:COLUMBIA	0.004	0.006	0.000	0.001	0.021	0.012	0.001	0.003	0.012	0.009
TX:AUSTIN	0.010	0.011	0.000	0.000	0.013	0.008	0.002	0.003	0.020	0.011
VA:LYNCHBURG	0.002	0.006	0.000	0.001	0.131	0.030	-0.001	0.003	0.008	0.007
WV:CHARLESTON	0.001	0.006	0.004	0.010	0.032	0.013	-0.004	0.004	0.012	0.008

THE MINIMUM DETECTABLE LIMIT IS .015 pCi/SAMPLE, FOR EACH INDIVIDUAL ISOTOPE.

s SIGMA COUNTING ERROR

Krypton-85

Krypton-85 is a long-lived noble gas with a half life of 10.8 years. It is released into the atmosphere by nuclear reactor operations, fuel fabrication, fuel reprocessing, and nuclear detonations. Krypton-85 also occurs naturally in minor quantities primarily from the neutron capture of stable krypton-84 as well as spontaneous fission and neutron-induced fission of uranium. Monitoring of krypton-85 in the atmosphere has been conducted to identify and establish baseline levels and long-term trends.

Krypton-85 analysis began in January 1973 with sample collections and analyses being performed for 12 sampling locations. These locations were selected to provide atmospheric coverage of the United States with considerations being given to the proximity to fuel reprocessing plants, nuclear reactors, and wide geographic coverage.

Dry compressed air samples, collected at each location, are purchased from commercial air suppliers annually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

The Kr-85 results for 1976, 1977 and 1979 are shown in Table 11.

TABLE 11

KRYPTON-85

LOCATION	DATE COLLECTED	pCi/m**3	2 SIGMA ERROR
MI:DETROIT	12/15/76	14.9	1.5
MI:DETROIT	5/15/77	14.8	1.5
CA:OAKLAND	11/15/76	10.9	1.1
OR:PORTLAND	12/15/76	23.3	2.3
MA:BOSTON	5/15/77	16.8	1.7
NJ:CAMDEN	4/15/77	15.4	1.5
NJ:CAMDEN	3/15/79	24.4	2.4
OK:OKLAHOMA CITY	3/15/79	17.4	1.7
FL:TAMPA	5/15/77	17.0	1.7
FL:TAMPA	3/15/79	23.6	2.4
IL:CHICAGO	4/15/77	21.5	2.2

ERAMS

SECTION II. Water Program

The ERAMS water program provides ambient radiation data to assess the effects of the nuclear power industry, the natural radiation environment, and other nuclear sources on the nation's rivers, streams and drinking water supplies.

Surface Water

Grab samples are taken quarterly at 58 stations located downstream from operating or future nuclear facilities.

Surface water monitoring consists of tritium analyses quarterly and gamma scans annually. Tritium is the primary radioactive pollutant from nuclear power plants.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine if there is a buildup of other contaminants.

Tritium concentrations for surface water samples for April - June 1982 are given in Table 12.

Results from the 1982 annual gamma analyses of surface water are shown in Table 13.

TABLE 12

SURFACE WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1982

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
AL:DECATUR	TENNESSEE RIVER	4/ 7/82	0.2	0.2
AL:DOTHAN	CHATTAHOOCHIE RIVER	4/13/82	0.3	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	4/ 8/82	0.3	0.2
CA:CLAY STATION	FOLSOM S. CANAL	4/ 5/82	0.4	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	4/ 6/82	0.2	0.2
CA:EUREKA	HUMBOLDT BAY	4/ 8/82	0.2	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	5/25/82	0.3	0.2
CO:GREELEY	SOUTH PLATTE RIVER	4/16/82	1.8	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	5/ 4/82	0.2	0.2
CT:WATERFORD	LONG ISLAND SOUND	5/ 5/82	0.2	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	4/12/82	0.2	0.2
FL:FORT PIERCE	ATLANTIC OCEAN	4/27/82	0.1	0.2
FL:HOMESTEAD	BISCAYNE BAY	4/28/82	0.1	0.2
GA:BAXLEY	ALTAMAHA RIVER	4/ 8/82	0.3	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	4/20/82	0.2	0.2
ID:BUHL	SNAKE RIVER	4/20/82	0.3	0.2
IL:MARSEILLES	ILLINOIS RIVER	6/30/82	0.2	0.2
IL:MOLINE	MISSISSIPPI RIVER	5/15/82	0.2	0.2
IL:MORRIS	ILLINOIS RIVER	6/24/82	0.2	0.2
IL:OREGON	ROCK RIVER	6/30/82	0.3	0.2
IL:ZION	LAKE MICHIGAN	6/30/82	0.3	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	4/ 7/82	0.2	0.2
MA:PLYMOUTH	CAPE CODE BAY	4/ 5/82	0.3	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	4/13/82	0.2	0.2
MD:LUSBY	CHESAPEAKE BAY	4/13/82	0.3	0.2
ME:WISCASSET	MONTSEWAY BAY	4/ 9/82	0.2	0.2
MI:BRIDGMAN	LAKE MICHIGAN	4/17/82	0.3	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	4/ 9/82	0.2	0.2
MI:MONROE	LAKE ERIE	4/26/82	0.4	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	4/ 7/82	0.2	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	4/ 8/82	0.3	0.2
MN:RED WING	MISSISSIPPI RIVER	4/14/82	0.3	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	4/15/82	0.2	0.2
NC:CHARLOTTE	CATAWBA RIVER	4/14/82	0.2	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	4/26/82	0.2	0.2
NJ:BAYSIDE	DELAWARE RIVER	4/13/82	0.2	0.2
NJ:OYSTER CREEK	OYSTER CREEK	4/ 8/82	0.3	0.2
NV:BOULDER CITY	COLORADO RIVER	4/ 5/82	0.4	0.2
NY:OSSINING	HUDSON RIVER	5/19/82	0.3	0.2
NY:OSWEGO	LAKE ONTARIO	4/ 9/82	0.5	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	4/ 7/82	0.1	0.2
OH:TOLEDO	LAKE ERIE	4/ 1/82	0.3	0.2

TABLE 12 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1982

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
OR:BRADWOOD	COLUMBIA RIVER	5/ 2/82	0.4	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	4/14/82	0.2	0.2
SC:ALLENDALE	SAVANNAH RIVER	4/22/82	1.1	0.2
SC:BROAD RIVER	BROAD RIVER	4/30/82	0.2	0.2
SC:HARTSVILLE	LAKE ROBINSON	4/27/82	0.6	0.2
TN:DAISY	TENNESSEE RIVER	5/ 6/82	0.6	0.2
TN:KINGSTON	CLINCH RIVER	6/14/82	1.8	0.2
TX:EL PASO	RIO GRANDE	4/16/82	0.3	0.2
TX:MATAGORDA	COLORADO RIVER	5/16/82	0.2	0.2
VT:VERNON	CONNECTICUT RIVER	6/30/82	0.3	0.2
WA:NORTHPORT	COLUMBIA RIVER	5/13/82	0.3	0.2
WA:RICHLAND	COLUMBIA RIVER	4/12/82	0.3	0.2
WI:TWO CREEKS	LAKE MICHIGAN	5/ 3/82	0.3	0.2
WI:VICTORY	MISSISSIPPI RIVER	4/ 8/82	0.4	0.2
WV:WHEELING	OHIO RIVER	4/ 6/82	0.4	0.2

s SIGMA COUNTING ERROR

TABLE 13

SURFACE WATER
ANNUAL GAMMA ANALYSIS

1982

LOCATION	SOURCE	DATE COLLECTED	GAMMA pCi/l ± 2s
AL:DECATUR	TENNESSEE RIVER	4/ 7/82	ND
AL:DOTHAN	CHATTAHOOCHIE RIVER	4/13/82	ND
AL:SCOTTSBORO	TENNESSEE RIVER	4/ 8/82	ND
CA:CLAY STATION	FOLSOM S. CANAL	4/ 5/82	ND
CA:DIABLO CANYON	PACIFIC OCEAN	4/ 6/82	ND
CA:EUREKA	HUMBOLDT BAY	4/ 8/82	^{40}K 193 ± 41%
CA:SAN ONOFRE	PACIFIC OCEAN	5/25/82	^{40}K 272 ± 61%
CO:GREELEY	SOUTH PLATTE RIVER	4/16/82	ND
CT:EAST HADDAM	CONNECTICUT RIVER	5/ 4/82	ND
CT:WATERFORD	LONG ISLAND SOUND	5/ 5/82	^{40}K 227 ± 35%
FL:CRYSTAL RIVER	GULF OF MEXICO	4/12/82	ND
FL:FORT PIERCE	ATLANTIC OCEAN	4/27/82	ND
FL:HOMESTEAD	BISCAYNE BAY	4/28/82	ND
GA:BAXLEY	ALTAMAHA RIVER	4/ 8/82	ND
IA:CEDAR RAPIDS	CEDAR RIVER	4/20/82	ND
ID:BUHL	SNAKE RIVER	4/20/82	ND
IL:MARSEILLES	ILLINOIS RIVER	6/30/82	ND
IL:MOLINE	MISSISSIPPI RIVER	5/15/82	ND
IL:MORRIS	ILLINOIS RIVER	6/24/82	ND
IL:OREGON	ROCK RIVER	6/30/82	ND
IL:ZION	LAKE MICHIGAN	6/30/82	ND
LA:NEW ORLEANS	MISSISSIPPI RIVER	4/ 7/82	ND
MA:PLYMOUTH	CAPE CODE BAY	4/ 5/82	ND
MD:CONOWINGO	SUSQUEHANNA RIVER	4/13/82	ND
MD:LUSBY	CHESAPEAKE BAY	4/13/82	ND
ME:WISCASSET	MONTSEWAY BAY	4/ 9/82	ND
MI:BRIDGMAN	LAKE MICHIGAN	4/17/82	ND
MI:CHARLEVOIX	LAKE MICHIGAN	4/ 9/82	ND
MI:MONROE	LAKE ERIE	4/26/82	ND
MI:SOUTH HAVEN	LAKE MICHIGAN	4/ 7/82	ND
MN:MONTICELLO	MISSISSIPPI RIVER	4/ 8/82	ND
MN:RED WING	MISSISSIPPI RIVER	4/14/82	ND
MS:PORT GIBSON	MISSISSIPPI RIVER	4/15/82	ND
NC:CHARLOTTE	CATAWBA RIVER	4/14/82	ND
NC:SOUTHPORT	ATLANTIC OCEAN	4/26/82	^{40}K 106 ± 72%
NJ:BAYSIDE	DELAWARE RIVER	4/13/82	ND
NJ:OYSTER CREEK	OYSTER CREEK	4/ 8/82	^{40}K 111 ± 69%
NV:BOULDER CITY	COLORADO RIVER	4/ 5/82	ND
NY:OSSINING	HUDSON RIVER	5/19/82	ND
NY:OSWEGO	LAKE ONTARIO	4/ 9/82	ND
NY:POUGHKEEPSIE	HUDSON RIVER	4/ 7/82	ND
OH:TOLEDO	LAKE ERIE	4/ 1/82	ND
OR:BRADWOOD	COLUMBIA RIVER	5/ 2/82	ND

TABLE 13 (CONTINUED)

SURFACE WATER
ANNUAL GAMMA ANALYSIS

1982

LOCATION	SOURCE	DATE COLLECTED	GAMMA pCi/l ± 2s
PA:DANVILLE	SUSQUEHANNA RIVER	4/14/82	ND
SC:ALLENDALE	SAVANNAH RIVER	4/22/82	ND
SC:BROAD RIVER	BROAD RIVER	4/30/82	ND
SC:HARTSVILLE	LAKE ROBINSON	4/27/82	ND
TN:DAISY	TENNESSEE RIVER	5/ 6/82	ND
TN:KINGSTON	CLINCH RIVER	6/14/82	ND
TX:EL PASO	RIO GRANDE	4/16/82	ND
TX:MATAGORDA	COLORADO RIVER	5/16/82	ND
VT:VERNON	CONNECTICUT RIVER	6/30/82	ND
WA:NORTHPORT	COLUMBIA RIVER	5/13/82	ND
WA:RICHLAND	COLUMBIA RIVER	4/12/82	ND
WI:TWO CREEKS	LAKE MICHIGAN	5/ 3/82	ND
WI:VICTORY	MISSISSIPPI RIVER	4/ 8/82	ND
WV:WHEELING	OHIO RIVER	4/ 6/82	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental levels, and other pertinent sources. These data serve to assess trends and anomalies in concentrations, and to compare with standards set forth in the EPA "National Interim Primary Drinking Water Regulations." These regulations provide for approval of supplies when the combined radium-226 and radium-228 levels do not exceed 5 pCi/l, when the gross alpha (excluding radon and uranium) levels do not exceed 15 pCi/l, when tritium levels do not exceed 20,000 pCi/l, when the strontium-90 levels do not exceed 8 pCi/l, and when the gross beta levels do not exceed 50 pCi/l.

Grab samples are taken at 78 sites which are either major population centers or selected nuclear facility environs.

The analyses include (a) tritium on a quarterly basis (b) gross alpha, gross beta, and strontium-90 on annual composites (gamma analyses are performed if the gross beta activity is greater than 10 pCi/l; radium-226 analyses are performed if the gross alpha exceeds 2 pCi/l; and radium-228 analyses are performed if the radium-226 activity falls between 3 and 5 pCi/l) (c) specific iodine-131 is performed on one quarterly sample per year for each station (d) an annual composite for plutonium-238, -239, uranium-234, -235, -238 for stations which demonstrate gross alpha levels greater than 2 pCi/l.

Tritium analyses are performed by scintillation counting of the distilled samples, gross beta, and gross alpha by evaporating an aliquot on stainless steel planchets for counting, and radium-226 by the standard emanation technique. Strontium-90 is determined by beta counting a strontium carbonate precipitate isolated by ion exchange.

The results of tritium in drinking water analyses for April - June 1982 are shown in Table 14.

Plutonium and uranium analyses are similar to procedures given for air particulate samples. Analyses were altered to coincide with revised EPA standards.

The results for 1982 composite samples are shown in Table 15.

All samples were taken as either a single grab sample or composite samples taken over 12 to 14 days.

TABLE 14

DRINKING WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1982

LOCATION	DATE COLLECTED	nCi/l	± 2s
AK:FAIRBANKS	4/ 6/82	0.2	0.2
AL:DOTHAN	4/13/82	0.3	0.2
AL:MONTGOMERY	4/ 5/82	0.3	0.2
AL:MUSCLE SHOALS	4/ 7/82	0.2	0.2
AL:SCOTTSBORO	4/ 8/82	0.3	0.2
CA:BERKELEY	4/ 7/82	0.3	0.2
CA:LOS ANCELES	4/ 5/82	0.1	0.2
CO:DENVER	4/16/82	0.3	0.2
CO:PLATTEVILLE	4/16/82	0.4	0.2
CT:HARTFORD	4/12/82	0.2	0.2
DE:DOVER	4/14/82	0.1	0.2
FL:MIAMI	4/ 5/82	0.1	0.2
FL:TAMPA	4/ 5/82	0.2	0.2
GA:BAXLEY	4/ 8/82	0.2	0.2
GA:SAVANNAH	4/12/82	3.1	0.2
HI:HONOLULU	4/ 6/82	0.2	0.2
IA:CEDAR RAPIDS	4/20/82	0.4	0.2
ID:BOISE	4/ 1/82	0.2	0.2
ID:IDAHO FALLS	4/ 8/82	0.3	0.2
IL:MORRIS	4/ 7/82	0.2	0.2
IL:W. CHICAGO	4/ 1/82	0.2	0.2
KS:TOPEKA	4/ 2/82	0.2	0.2
LA:NEW ORLEANS	4/14/82	0.3	0.2
MA:LAWRENCE	4/12/82	0.3	0.2
MD:BALTIMORE	4/13/82	0.3	0.2
MD:CONOWINGO	4/13/82	0.2	0.2
ME:AUGUSTA	4/ 5/82	0.2	0.2
MI:DETROIT	4/12/82	0.5	0.2
MI:GRAND RAPIDS	4/13/82	0.4	0.2
MN:MINNEAPOLIS	4/ 8/82	0.3	0.2
MN:RED WING	4/ 9/82	0.2	0.2
MO:JEFFERSON CITY	4/19/82	0.2	0.2
MS:JACKSON	4/15/82	0.2	0.2
MS:PORT GIBSON	4/15/82	0.2	0.2
MT:HELENA	4/ 5/82	0.2	0.2
NC:CHARLOTTE	4/14/82	0.5	0.2
NC:WILMINGTON	4/22/82	0.3	0.2
ND:BISMARCK	4/ 1/82	0.3	0.2
NE:LINCOLN	4/ 5/82	0.3	0.2
NH:CONCORD	4/ 2/82	0.2	0.2
NJ:TRENTON	4/13/82	0.2	0.2
NJ:WARETOWN	4/15/82	0.2	0.2
NM:SANTA FE	4/ 5/82	0.2	0.2
NV:LAS VEGAS	4/ 2/82	0.2	0.2

TABLE 14 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1982

LOCATION	DATE COLLECTED	nCi/l	± 2s
NY:ALBANY	4/ 7/82	0.2	0.2
NY:NEW YORK CITY	4/ 1/82	0.2	0.2
NY:NIAGARA FALLS	4/ 5/82	0.2	0.2
NY:SYRACUSE	6/15/82	0.2	0.2
OH:CINCINNATI	5/15/82	0.2	0.2
OH:COLUMBUS	6/ 1/82	0.2	0.2
OH:EAST LIVERPOOL	4/14/82	0.2	0.2
OH:PAINESVILLE	4/20/82	0.4	0.2
OH:TOLEDO	4/ 1/82	0.2	0.2
OK:OKLAHOMA CITY	4/ 6/82	0.6	0.2
OR:PORTLAND	4/ 2/82	0.2	0.2
PA:COLUMBIA	4/15/82	0.2	0.2
PA:HARRISBURG	4/14/82	0.2	0.2
PA:PITTSBURGH	4/14/82	0.3	0.2
PC:ANCON	6/ 1/82	0.2	0.2
RI:PROVIDENCE	4/ 5/82	0.2	0.2
SC:BARNWELL	4/22/82	0.2	0.2
SC:COLUMBIA	4/13/82	0.4	0.2
SC:HARTSVILLE	4/27/82	0.2	0.2
SC:JENKINSVILLE	4/30/82	0.2	0.2
SC:SENECA	4/13/82	0.2	0.2
TN:CHATTANOOGA	6/11/82	0.5	0.2
TN:KNOXVILLE	4/ 2/82	0.1	0.2
TX:AUSTIN	5/18/82	0.2	0.2
VA:DOSWELL	4/19/82	0.3	0.2
VA:LYNCHBURG	4/ 5/82	0.2	0.2
VA:VIRGINIA BEACH	4/ 1/82	0.2	0.2
WA:RICHLAND	4/12/82	0.3	0.2
WI:GENOA CITY	4/ 8/82	0.2	0.2
WI:MADISON	4/ 7/82	0.1	0.2

s SIGMA COUNTING ERROR

TABLE 15

PLUTONIUM AND URANIUM ANALYSES
OF
SELECTED DRINKING WATER COMPOSITE SAMPLES

1981 COMPOSITE

LOCATION	^{238}Pu pCi/l ± 2s		^{239}Pu pCi/l ± 2s		^{234}U pCi/l ± 2s		^{235}U pCi/l ± 2s		^{238}U pCi/l ± 2s	
CA:LOS ANGELES	0.000	0.024	0.008	0.009	1.884	0.275	0.082	0.031	1.513	0.227
CO:DENVER	-.004	0.010	0.006	0.006	1.168	0.171	0.066	0.024	0.849	0.130
CO:PLATTEVILLE	0.042	0.021	0.005	0.009	4.814	0.689	0.306	0.068	3.766	0.546
IL:CHICAGO	0.004	0.010	0.009	0.006	1.248	0.181	0.008	0.006	0.081	0.022
IL:MORRIS	0.008	0.007	-0.001	0.002	0.403	0.065	0.011	0.007	0.054	0.016
MN:RED WING	0.003	0.008	-0.004	0.004	0.195	0.042	0.007	0.005	0.047	0.018
MO:JEFFERSON CITY	0.006	0.009	0.000	0.000	1.063	0.159	0.018	0.010	0.140	0.032
NE:LINCOLN	0.012	0.012	0.001	0.002	2.589	0.358	0.086	0.022	1.776	0.250
NM:SANTA FE	0.007	0.012	0.000	0.004	10.140	1.422	0.379	0.069	8.349	1.175
NV:LAS VEGAS	0.004	0.009	-0.001	0.003	2.733	0.409	0.095	0.028	1.606	0.249
SC:JENKINSVILLE	0.013	0.013	0.002	0.004	59.320	7.671	0.723	0.261	15.220	2.184

THE MINIMUM DETECTABLE LEVEL IS .015 pCi/SAMPLE, FOR EACH INDIVIDUAL ISOTOPE.

s SIGMA COUNTING ERROR

Radon-222 in Drinking Water

Radon-222 in drinking water has previously been considered a source of radiation exposure primarily from an ingestion standpoint. The Office of Radiation Programs (ORP) of the U.S. Environmental Protection Agency (EPA) is investigating radon in water supplies to evaluate the possibility that a major pathway from inhalation exposure may exist in addition to the ingestion pathway. As an inert gas, radon is not chemically bound to the water and consequently can be released during any operation that aerates or agitates water. Depending upon the initial concentration of radon in water, significant quantities of radon could be released in a home or to the general environment.

To determine the scope of this potential problem, a national ground water sampling program has been initiated by the Eastern Environmental Radiation Facility (EERF) to obtain data on radon concentrations in water supplies throughout the country. Sampling kits have been assembled by EERF and distributed to various state health departments. The kit is designed so that state personnel can collect samples from potable water supplies and ship them, without loss of radon other than radioactive decay, to EERF for analysis.

The selection of water supplies to be sampled is handled by two separate methods. Method 1 in which each state collects samples from all groundwater supplies serving at least 1000 people and Method 2 in which the choice of sampling locations and the number of supplies to be sampled is left to the discretion of the state programs. Each state is asked to obtain a representative sampling of ground water supplies within its boundaries. The extent of the sampling efforts and how representative the data are for a given state is determined primarily by the amount of time each state devotes to the program.

The concentrations of radon in water are determined at the EERF by liquid scintillation counting. The limit of detection for this technique using a 50-minute count and a 10-ml sample is 0.16 pCi or 16 pci/l.

The sampling kits are being provided to the various states on a rotating schedule. This schedule is designed to cover the U.S. within approximately two years.

Summaries of the data from Alabama, Colorado, Massachusetts, Minnesota, Mississippi and Utah are shown in Tables 16 - 21.

TABLE 16

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
AL:ABBEVILLE	5/18/82	3100	57.9	47.5
AL:ALABASTER	8/ 5/82	15000	228.9	49.2
AL:ALEXANDRIA	7/27/82	6855	24.2	49.7
AL:ALICEVILLE	8/ 3/82	3150	152.8	58.0
AL:ANDALUSIA	7/21/82	11877	76.9	49.2
AL:ANNISTON	7/27/82	53100	450.9	56.3
AL:ATMORE	6/ 9/82	9600	57.3	59.2
AL:BAKERHILL	5/18/82	3348	251.1	51.5
AL:BAY MINETTE	6/ 9/82	8262	2.2	58.1
AL:BAYOU LA BATRE	6/ 8/82	5934	136.3	67.4
AL:BRENT	6/ 3/82	3000	340.0	54.4
AL:BREWTON	6/ 9/82	7104	61.9	59.3
AL:BRUNDIDGE	5/18/82	3150	106.5	48.2
AL:CALERA	6/ 3/82	4500	86.1	48.9
AL:CARROLLTON	8/ 3/82	1200	26.2	55.1
AL:CHILDERSBURG	7/27/82	6528	132.8	51.5
AL:COLUMBIANA	8/ 5/82	3000	53.8	46.9
AL:DAPHNE	6/ 8/82	4440	50.6	65.3
AL:DEMOPOLIS	8/ 3/82	7422	99.9	57.5
AL:DOTHAN	5/18/82	48000	60.3	47.5
AL:EAST BREWTON	6/ 9/82	3108	36.6	58.4
AL:ELBA	7/21/82	5000	68.1	47.0
AL:ELMORE	6/ 3/82	5400	24.7	47.8
AL:ENTERPRISE	7/21/82	18000	37.0	46.6
AL:EUFAULA	5/18/82	12000	186.9	49.5
AL:EVERGREEN	6/ 8/82	4800	33.0	56.2
AL:FAIRHOPE	6/ 8/82	13800	41.8	65.4
AL:FLORALA	7/21/82	3018	89.6	49.4
AL:FOLEY	6/ 9/82	4518	110.6	60.2
AL:FT. RUCKER	5/18/82	14950	38.5	46.7
AL:GENEVA	7/21/82	4986	104.6	50.2
AL:GLENCOE	7/27/82	4275	118.5	51.5
AL:GRAND BAY	6/ 8/82	3600	36.6	46.6
AL:GREENSBORO	8/ 3/82	3900	20.1	55.5
AL:GREENVILLE	6/ 8/82	7800	88.0	57.4
AL:GULF SHORES	6/ 9/82	4320	201.1	61.9
AL:HAMILTON	8/ 3/82	7170	67.9	55.7
AL:HANCEVILLE	8/ 4/82	3450	-7.3	47.6
AL:HARTFORD	7/21/82	3165	129.7	48.4
AL:HEADLAND	5/18/82	3100	68.7	48.2
AL:HOKES BLUFF	7/27/82	3600	87.9	50.4
AL:HOLTVILLE	6/ 3/82	1126	10.1	47.9
AL:IRONDALE	8/ 5/82	8583	218.2	48.9
AL:JACKSONVILLE	7/27/82	7800	112.5	51.1
AL:KILLEN	8/ 4/82	3330	472.3	56.3
AL:LADONIA	5/20/82	2200	241.9	44.7

TABLE 16 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
AL:LEEDS	8/ 5/82	10773	586.1	55.7
AL:LUVERNE	7/21/82	3594	79.9	49.6
AL:MADISON	8/ 4/82	4997	506.9	58.2
AL:MARION	8/ 3/82	3864	39.7	56.0
AL:MCCALLA	8/ 5/82	6300	505.1	52.9
AL:MILLBROOK	6/ 3/82	5100	59.6	48.6
AL:MONROEVILLE	6/ 8/82	7500	161.4	68.7
AL:MONTEVALLO	6/ 3/82	5700	154.6	50.2
AL:MONTEVALLO	6/ 3/82	3000	276.2	52.8
AL:OPP	7/21/82	9486	100.2	49.9
AL:ORANGE BEACH	6/ 9/82	3405	39.8	58.9
AL:OZARK	5/18/82	16000	65.2	47.6
AL:PELHAM	8/ 5/82	9000	284.6	51.0
AL:PELL CITY	7/27/82	8292	207.2	52.8
AL:PRATTVILLE	8/ 5/82	19000	99.9	47.8
AL:SARALAND	6/ 8/82	10143	94.9	67.0
AL:SATSUMA	6/ 8/82	3636	23.0	65.6
AL:SELMA	8/ 3/82	3120	29.6	56.4
AL:SELMA	8/ 3/82	25440	285.2	59.7
AL:SMITHS	5/20/82	2600	22.6	40.9
AL:THEODORE	6/ 8/82	15810	142.5	67.7
AL:TROY	5/18/82	12693	67.5	48.2
AL:TRUSSVILLE	8/ 5/82	7500	367.6	51.2
AL:UNION SPRINGS	5/20/82	4359	154.8	43.3
AL:UNION SPRINGS	5/20/82	4500	174.9	43.7
AL:VERNON	8/ 3/82	3771	19.3	55.1
AL:WEAVER	7/27/82	4458	110.7	50.8
AL:WEST BLOCTON	6/ 3/82	3300	63.9	48.2

s = SIGMA ERROR (IN PERCENT)

TABLE 17

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
CO:AKRON	5/22/81	1900	231.9	113.2
CO:AURORA	4/21/81	1500	278.0	128.8
CO:AURORA	4/22/81	2400	-129.4	347.3
CO:BENTS FORT	1/29/81	1250	36.4	60.6
CO:BURLINGTON	2/18/81	4000	191.1	79.3
CO:BYERS	4/24/81	1000	86.4	262.3
CO:CASTLE ROCK	4/17/81	2850	779.1	136.3
CO:CHEROKEE	2/26/81	5000	171.6	62.9
CO:CHEYENNE WELLS	2/18/81	900	239.9	77.6
CO:COLORADO CITY	3/20/81	1200	505.0	173.4
CO:COMMERCE CITY	4/20/81	25000	153.7	101.3
CO:EADS	1/28/81	1100	251.5	71.7
CO:EATON	5/28/81	2300	848.3	147.3
CO:ENGLEWOOD	4/22/81	6100	351.6	443.8
CO:FOWLER	1/26/81	2000	145.4	91.5
CO:FT. LUPTON	5/27/81	4000	296.1	192.3
CO:GLENDALE	4/22/81	3500	141.7	439.4
CO:HAXTUN	5/21/81	1009	368.8	132.7
CO:HENDERSON	4/20/81	1000	122.3	99.7
CO:HOLLY	1/27/81	1500	752.2	86.3
CO:HOLYOKE	5/21/81	2200	196.3	126.2
CO:JULESBURG	5/21/81	1605	121.6	127.5
CO:LA JUNTA	1/29/81	11000	452.8	63.4
CO:LA SALLE	5/27/81	1300	388.8	190.6
CO:LAMAR	1/28/81	9900	989.2	79.2
CO:LAS ANIMAS	1/27/81	4000	334.4	81.9
CO:LIMON	2/18/81	2000	434.4	80.3
CO:MAY VALLEY	1/27/81	1200	729.7	87.1
CO:ORDWAY	1/28/81	1800	176.1	85.4
CO:PARKER	4/17/81	1500	74.4	125.7
CO:SAN LUIS	4/ 8/81	1500	2559.5	407.7
CO:SPRINGFIELD	1/27/81	1740	492.6	83.8
CO:STRATTMOOR HILL	2/25/81	3500	832.7	78.8
CO:WIDEFIELD	2/24/81	10000	340.7	87.3
CO:WOODMAN	2/27/81	2500	231.2	55.1
CO:WRAY	5/21/81	2300	242.4	127.0
CO:YUMA	5/22/81	3200	233.0	113.0

s = SIGMA ERROR (IN PERCENT)

TABLE 18

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
MA:ACTON	2/24/82	20000	835.9	117.0
MA:ASHLAND	9/23/81	10000	816.3	117.0
MA:AUBURN	7/15/81	7000	1390.5	125.2
MA:AUBURN	7/15/81	3000	1338.0	126.9
MA:AVON	4/27/81	5166	1168.0	87.3
MA:AYER	7/ 8/81	6300	1064.5	117.1
MA:BEDFORD	2/24/82	11611	42.8	105.8
MA:BELLINGHAM	9/30/81	14000	593.4	112.8
MA:BLACKSTONE	4/30/82	4500	652.5	91.4
MA:BREWSTER	2/17/82	4500	23.4	59.5
MA:BRIDGEWATER	4/24/81	17000	835.1	116.9
MA:BUZZARDS BAY	12/31/81	8500	267.0	91.6
MA:CHELMSFORD	2/24/82	21000	1180.5	129.8
MA:DEDHAM	3/ 8/82	36000	589.0	81.9
MA:DENNIS	2/17/82	5000	111.4	60.6
MA:DOUGLAS	9/30/81	3000	1417.0	127.5
MA:DRACUT	2/24/82	15000	804.9	116.5
MA:DUDLEY	4/16/81	7200	5003.0	150.1
MA:DUXBURY	4/27/81	14000	311.8	76.4
MA:EASTHAMPTON	4/ 7/81	13000	270.1	187.0
MA:EASTHAMPTON	4/ 7/81	13000	175.3	185.9
MA:EASTHAMPTON	4/ 7/81	13000	258.4	188.5
MA:EASTON	4/27/81	16000	1718.0	94.6
MA:ESSEX	4/28/82	3000	114.5	100.2
MA:FAIRHAVEN	4/24/81	17000	2175.0	130.5
MA:FOXBOROUGH	4/30/82	14200	1217.5	85.3
MA:FRANKLIN	9/30/81	18500	447.9	111.3
MA:GEORGETOWN	6/ 2/81	6000	1624.0	97.4
MA:GRAFTON	4/16/81	4966	1359.5	101.4
MA:GROVELAND	6/ 2/81	5300	935.0	93.5
MA:HAMILTON	4/28/82	7095	706.6	113.1
MA:HANOVER	4/23/81	11272	794.4	99.1
MA:HARWICH	2/17/82	10000	127.1	61.0
MA:HOLLISTON	9/23/81	12000	1320.0	125.2
MA:HOPKINTON	9/23/81	5500	916.5	119.2
MA:HYANNIS	12/31/81	20000	203.9	90.8
MA:KINGSTON	4/27/81	6500	1058.5	84.7
MA:LANCASTER	7/15/81	6000	819.4	125.7
MA:LANESBORO	4/ 8/81	2000	-28.1	110.4
MA:LANESBORO	4/ 8/81	2000	951.4	128.3
MA:LITTLETON	7/ 8/81	5250	1331.0	119.8
MA:LUNENBURG	7/15/81	5300	1186.0	130.5
MA:LYNNFIELD	3/ 8/82	9500	1538.5	77.0
MA:MARSHFIELD	4/27/81	21000	765.4	84.2
MA:MASHPEE	12/31/81	1500	287.5	89.1
MA:MATTAPOISETT	2/18/82	5702	765.8	95.5
MA:MEDFIELD	4/30/82	10700	741.5	89.0
MA:MEDWAY	9/23/81	8500	515.0	115.8
MA:MERRIMAC	6/ 2/81	4200	1554.5	100.6
MA:MIDDLEBORO	4/24/81	16000	607.2	113.8
MA:MILLBURY	4/16/81	9116	972.5	97.3
MA:MILLIS	9/23/81	6500	416.6	112.3

TABLE 18 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
MA:NANTUCKET	6/18/82	5340	269.8	72.1
MA:NATICK	9/23/81	32000	581.2	115.1
MA:NO. ATTLEBORO	7/14/82	18000	607.5	66.8
MA:NO. RAYNHAM	4/24/81	4000	282.4	120.9
MA:NO. READING	3/ 8/82	12300	674.3	70.6
MA:NORTON	7/14/82	13000	456.5	63.9
MA:NORWELL	4/23/81	9000	822.4	102.6
MA:OSTERVILLE	12/31/81	8000	228.1	88.9
MA:OXFORD	4/16/81	6000	2438.5	122.0
MA:PALMER	4/ 9/81	3377	405.1	98.2
MA:PEPPERELL	7/ 8/81	6000	1015.2	116.7
MA:PLAINVILLE	7/14/82	4500	747.0	70.8
MA:PROVINCETOWN	2/17/82	4000	96.6	61.4
MA:READING	3/ 8/82	23500	664.7	69.8
MA:ROWLEY	6/ 2/81	3000	328.7	80.9
MA:SAGAMORE	12/31/81	8000	288.1	91.7
MA:SALISBURY	6/ 2/81	20000	1085.5	92.2
MA:SANDWICH	12/31/81	10000	189.8	98.6
MA:SEEKONK	2/18/82	12800	185.8	85.4
MA:SHARON	4/27/81	13500	1076.5	86.1
MA:SHIRLEY	7/ 8/81	3100	519.2	106.9
MA:SHREWSBURY	4/16/81	23000	1118.0	100.6
MA:SMU	4/24/81	5000	1564.5	132.6
MA:SOUTH DENNIS	2/17/82	22000	88.4	60.1
MA:STERLING	7/15/81	4525	1594.0	135.5
MA:STURBRIDGE	4/ 9/81	7000	145.1	92.5
MA:SUDBURY	4/28/82	13000	971.5	111.7
MA:SWANSEA	2/18/82	15500	685.6	92.4
MA:TEMPLETON	2/24/82	6000	915.7	119.1
MA:TEWKSBURY	2/24/82	26000	617.0	116.9
MA:TISBURY	6/16/82	5000	153.9	61.7
MA:TOPSFIELD	4/28/82	3800	789.4	109.9
MA:TOWNSEND	7/15/81	4123	1317.0	137.9
MA:UPTON	9/30/81	2000	573.3	114.3
MA:UXBRIDGE	9/30/81	4000	913.5	118.8
MA:WARE	4/ 9/81	8679	127.4	94.2
MA:WAYLAND	9/23/81	12542	1014.9	121.1
MA:WEBSTER	4/16/81	14400	2022.5	111.1
MA:WELLESLEY	3/ 8/82	28000	546.5	68.2
MA:WENHAM	4/28/82	3280	877.2	114.1
MA:WEST BRIDGEWATE	4/24/81	6666	215.8	107.9
MA:WESTFORD	7/ 8/81	3000	526.5	111.6
MA:WESTFORD	7/ 8/81	7000	825.6	115.6
MA:WHITINSVILLE	9/30/81	12000	697.3	114.9
MA:WILLIAMSTOWN	7/27/82	8000	367.5	132.3
MA:WILMINGTON	3/ 8/82	18000	860.9	73.2
MA:WRENTHAM	4/30/82	5700	45.9	79.9
MA:YARMOUTH	2/17/82	19000	159.2	61.7

s = SIGMA ERROR (IN PERCENT)

TABLE 19

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
MN:ALBERT LEA	2/16/82	19418	22.7	60.2
MN:ALEXANDRIA	12/28/81	7500	175.1	204.7
MN:ANOKA	2/ 4/82	15860	424.6	96.9
MN:APPLE VALLEY	10/ 7/81	21500	222.1	133.9
MN:AURORA	10/ 8/81	2725	60.2	109.5
MN:BABBITT	10/28/81	2480	46.4	148.0
MN:BEMIDJI	11/20/81	11000	248.2	260.8
MN:BENSON	11/ 5/81	3600	137.8	96.5
MN:BLAINE	2/ 4/82	27000	387.6	96.7
MN:BLOOMINGTON	10/16/81	80900	196.1	100.8
MN:BLUE EARTH	10/14/81	4000	139.4	106.2
MN:BRAINARD	9/14/81	11600	466.9	108.4
MN:BROOKLYN CENTER	2/11/82	34000	206.9	107.6
MN:BROOKLYN PARK	2/11/82	32000	49.3	105.6
MN:BUFFALO	2/25/82	4000	129.4	86.4
MN:BURNSVILLE	2/25/82	35000	198.4	85.2
MN:CAMBRIDGE	2/ 4/82	3470	432.3	97.7
MN:CHANHASSEN	2/25/82	4200	126.5	87.1
MN:CHASKA	1/ 8/82	6200	178.7	74.3
MN:CIRCLE PINES	1/14/82	4500	151.4	89.8
MN:COON RAPIDS	10/14/81	32000	380.8	110.0
MN:COTTAGE GROVE	2/26/82	16000	306.0	76.5
MN:DETROIT LAKES	12/ 8/81	6725	106.3	71.9
MN:EAGAN	1/ 6/82	20000	199.9	105.6
MN:EDEN PRAIRIE	2/25/82	15000	83.0	86.2
MN:EDINA	2/25/82	46000	367.4	91.1
MN:EXCELSIOR	1/25/82	2700	143.1	70.8
MN:FARIBAULT	2/ 9/82	17000	220.7	61.0
MN:FARMINGTON	10/23/81	4390	228.0	72.9
MN:FOREST LAKE	12/18/81	4710	190.0	73.1
MN:FRIDLEY	2/11/82	31000	199.2	103.6
MN:GLENCO	12/ 2/81	4750	379.0	119.3
MN:GRAND RAPIDS	11/19/81	7250	349.0	303.2
MN:HASTINGS	10/28/81	12000	122.1	150.2
MN:HIBBING	10/ 7/81	20000	171.5	133.8
MN:HOPKINS	2/ 9/82	16800	146.4	76.1
MN:HUTCHINSON	12/ 2/81	9244	99.0	112.0
MN:JACKSON	12/18/81	3970	53.6	250.5
MN:LA CRESCENT	2/10/82	4131	177.4	126.2
MN:LAKE CITY	2/10/82	4000	163.6	122.7
MN:LAKEVILLE	10/21/81	10000	171.2	60.7
MN:LE SUEUR	1/ 8/82	1380	75.0	143.1
MN:LITCHFIELD	11/19/81	5800	81.7	99.1
MN:LITTLE FALLS	12/ 7/81	7500	22.9	68.4
MN:LUVERNE	12/21/81	4249	-1.6	145.2
MN:MADISON LAKE	10/26/81	588	535.7	66.9
MN:MAHTOMEDI	9/ 9/81	3500	595.2	68.3
MN:MANKATO	10/ 7/81	230000	152.1	65.2
MN:MARSHALL	12/14/81	11000	112.2	59.7
MN:MINNETONKA	1/27/82	37000	64.3	100.5
MN:MINNETRISTA	11/16/81	2878	803.3	80.3
MN:MONTEVIDEO	10/ 6/81	5700	52.6	156.3

TABLE 19 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
MN:MORRIS	11/ 5/81	5000	12.0	92.3
MN:MOUND	2/ 9/82	13000	216.3	77.8
MN:MOUNDSVIEW	2/17/82	13500	713.9	110.6
MN:N. MANKATO	12/ 8/81	9100	563.6	78.6
MN:NEW BRIGHTON	2/11/82	23300	249.9	107.4
MN:NEW ULM	10/15/81	15000	460.4	92.0
MN:NEWPORT	9/ 3/81	3000	156.8	117.6
MN:NORTH ST. PAUL	12/ 9/81	12000	290.9	132.3
MN:NORTHFIELD	2/ 9/82	8500	315.3	64.6
MN:NORTHFIELD	2/ 9/82	2700	83.0	60.7
MN:OAKDALE	9/17/81	10000	183.3	86.8
MN:OSSEO	2/10/82	2974	164.1	127.2
MN:OWATONNA	2/16/82	18642	49.2	58.7
MN:PARK RAPIDS	11/17/81	2300	330.6	439.5
MN:PIPESTONE	12/16/81	5000	1686.5	396.0
MN:PLYMOUTH	2/ 9/82	25000	389.1	69.1
MN:RED WING	2/ 1/82	13721	74.0	82.5
MN:REDWOOD FALLS	10/ 2/81	5200	-19.3	101.9
MN:RICHFIELD	11/20/81	45000	167.7	265.1
MN:ROBBINSDALE	2/11/82	17000	431.5	114.0
MN:ROCHESTER	2/17/82	69000	128.0	63.8
MN:ROLLINGSTONE	2/ 8/82	530	30.5	59.2
MN:ROSEMOUNT	1/13/82	3741	225.8	105.0
MN:SARTELL	1/ 8/82	3600	278.3	89.4
MN:SAUK CENTRE	11/17/81	3750	209.1	62.7
MN:SAUK RAPIDS	9/17/81	6200	298.8	86.5
MN:SAVAGE	2/25/82	5000	283.5	87.9
MN:SHAKOPEE	2/25/82	9600	412.1	128.0
MN:SHOREVIEW	2/23/82	12000	143.7	68.1
MN:SILVER LAKE	12/ 2/81	753	226.8	114.6
MN:SLEEPY EYE	11/25/81	3500	281.8	67.5
MN:SO. ST. PAUL	2/26/82	23000	277.0	76.2
MN:SPRING LAKE PAR	2/11/82	6400	519.7	113.3
MN:ST. ANTHONY	11/13/81	8000	343.1	83.4
MN:ST. JAMES	11/ 6/81	4323	110.6	71.0
MN:ST. LOUIS PARK	9/30/81	47000	203.9	108.6
MN:ST. PAUL	9/ 3/81	4600	-39.8	115.8
MN:ST. PETER	10/29/81	9000	-17.7	121.2
MN:STAPLES	12/ 4/81	3325	100.3	100.9
MN:STEWARTVILLE	2/ 8/82	4200	167.9	60.7
MN:STILLWATER	8/27/81	13200	384.3	88.2
MN:VIRGINIA	10/ 7/81	14500	-12.4	127.2
MN:WADENA	12/ 4/81	4620	4.7	97.1
MN:WAITE PARK	9/21/81	3000	279.1	72.6

TABLE 19 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pC1/1	± 2s
MN:WASECA	12/ 3/81	8219	81.7	95.7
MN:WAYZATA	2/ 9/82	4200	364.1	65.3
MN:WELLS	11/ 4/81	2800	241.3	101.8
MN:WHITE BEAR	12/11/81	4700	270.8	93.3
MN:WHITE BEAR LAKE	11/30/81	24000	114.4	97.8
MN:WILLMAR	10/27/81	13701	36.5	60.0
MN:WINDOM	12/18/81	4666	382.7	259.3
MN:WINONA	2/17/82	25011	98.0	62.6
MN:WOODBURG	2/26/82	8000	588.8	82.0
MN:WORTHINGTON	12/21/81	10000	117.6	149.0

s = SIGMA ERROR (IN PERCENT)

TABLE 20

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
MS:BAY ST. LOUIS	12/ 1/81	6752	184.6	62.5
MS:BENTON	7/28/82	4522	37.5	100.9
MS:BILOXI	12/ 2/81	48486	84.9	97.2
MS:BROOKHAVEN	6/ 4/81	10700	16.0	69.3
MS:BROOKHAVEN	6/ 4/81	5352	16.2	69.6
MS:CANTON	7/28/82	12810	23.8	71.6
MS:CANTON	7/29/82	4318	16.1	86.5
MS:CLINTON	7/22/82	12600	22.4	119.2
MS:COLUMBIA	6/ 4/81	7587	1.7	67.9
MS:CRYSTAL SPRINGS	6/ 4/81	4180	6.0	69.3
MS:ELLISVILLE	12/ 3/81	3150	154.1	85.2
MS:ELLISVILLE	12/ 3/81	4643	115.3	83.6
MS:ESATAQUA	12/ 2/81	5624	385.4	67.4
MS:GLENDALE	12/ 3/81	3080	107.7	85.3
MS:GULFPORT	12/ 2/81	6800	272.4	66.5
MS:GULFPORT	12/ 2/81	40791	220.5	64.9
MS:HATTIESBURG	12/ 3/81	57000	72.2	84.1
MS:HATTIESBURG	12/ 3/81	4358	32.6	82.4
MS:HAZELHURST	6/ 4/81	4577	92.0	70.9
MS:JACKSON	7/22/82	3934	18.5	114.2
MS:JACKSON	7/22/82	6657	59.5	120.5
MS:JACKSON	7/28/82	5875	56.7	101.9
MS:JACKSON	7/22/82	15660	88.9	120.4
MS:JACKSON	7/22/82	6122	34.1	114.7
MS:JACKSON	7/22/82	3536	-18.0	119.6
MS:KEESLER AFB	12/ 2/81	20250	43.0	96.2
MS:LAUREL	12/ 3/81	3046	36.0	82.9
MS:LAUREL	12/ 3/81	24145	86.7	84.0
MS:LONG BEACH	12/ 1/81	6170	118.4	59.2
MS:LUCEDALE	12/ 2/81	3040	-3.8	63.0
MS:MARTINS BLUFF	12/ 2/81	3650	110.1	64.2
MS:MCCOMB	6/ 5/81	11969	34.9	70.1
MS:MOSS POINT	12/ 2/81	20500	139.0	65.6
MS:NATCHEZ	6/ 5/81	19704	31.3	63.7
MS:NATCHEZ	6/ 5/81	5110	48.7	72.5
MS:OCEAN SPRINGS	12/ 2/81	13300	121.0	63.8
MS:PASCAGOULA	12/ 2/81	26500	-13.8	62.4
MS:PASS CHRISTIAN	12/ 1/81	4000	129.9	59.6
MS:PEARL	7/22/82	18238	85.3	116.0
MS:PETAL	12/ 3/81	6986	429.1	89.8
MS:PICAYUNE	12/ 1/81	10467	130.3	61.0
MS:PORT GIBSON	7/28/82	3500	21.1	71.0
MS:RICHLAND	7/22/82	3400	-51.3	112.0
MS:RIDGELAND	7/29/82	7405	21.6	87.0

TABLE 20 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
MS:TERRY	7/22/82	5000	67.9	119.6
MS:VICKSBURG	7/28/82	3502	-1.2	99.1
MS:VICKSBURG	7/28/82	35000	-6.2	99.7
MS:WASHINGTON-NATC	6/ 5/81	4417	144.3	65.6
MS:WAVELAND	12/ 1/81	3108	158.6	60.9
MS:WAYNESBORO	12/ 3/81	4368	104.0	86.2
MS:WHITFIELD	7/22/82	4138	58.1	114.7
MS:WOODVILLE	6/ 5/81	1734	1.5	63.2
MS:YAZOO CITY	7/28/82	10796	18.8	100.5

s = SIGMA ERROR (IN PERCENT)

TABLE 21

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
UT:ALPINE	8/17/81	2625	642.6	70.7
UT:AMERICAN FORK	8/17/81	12000	163.9	63.1
UT:BEAVER	5/ 7/81	2000	2436.5	121.9
UT:BEAVER	3/11/82	1800	106.8	85.0
UT:BOUNTIFUL	3/31/81	35000	995.7	49.8
UT:BOUNTIFUL	4/17/81	10000	286.7	78.1
UT:BRIGHAM	9/29/81	17000	553.0	79.5
UT:CEDAR CITY	5/ 7/81	11000	-20.1	61.5
UT:CENTERVILLE	4/21/81	10000	9.3	62.0
UT:CLEARFIELD	6/16/81	18500	191.6	63.0
UT:CLINTON	6/16/81	7000	185.2	62.1
UT:COPPERTON	7/28/81	1000	541.3	78.3
UT:DELTA CITY	3/10/82	2300	342.6	64.2
UT:DRAPER	4/10/81	1000	451.5	112.9
UT:DUCHESNE	3/15/82	2200	35.0	169.3
UT:DUCHESNE(UTE)	3/15/82	2700	358.1	60.7
UT:DUGWAY PROV. GD	3/17/81	2500	300.1	43.5
UT:EPHRAIM	5/22/81	2810	-10.8	100.9
UT:FARMINGTON	5/ 1/81	5200	971.7	87.5
UT:FILLMORE	3/ 9/82	2177	322.7	74.2
UT:FRUIT HEIGHTS	5/ 1/81	2800	216.9	71.4
UT:GARLAND	9/29/81	1480	885.6	84.1
UT:GRANGER	4/14/81	81905	314.0	84.8
UT:GRANTSVILLE	6/ 1/81	3100	555.0	85.9
UT:GUNNISON	5/21/81	1200	44.8	119.0
UT:HEBER CITY	10/22/81	5000	248.3	84.1
UT:HELPER	5/24/82	2700	174.3	60.0
UT:HIGHLAND	8/17/81	3000	605.2	69.4
UT:HILL AFB	5/ 1/81	18500	191.3	70.7
UT:HOLLADAY	4/13/81	12500	284.3	69.3
UT:HOOPER	8/ 4/81	5000	187.6	76.0
UT:HURRICANE	5/ 5/81	2600	38.9	75.9
UT:HYDE PARK	10/28/81	1300	217.7	148.1
UT:HYRUM	10/27/81	3975	335.1	75.4
UT:KANAB	5/ 5/81	1450	61.5	123.1
UT:LAWRENCE	5/24/82	1000	292.5	58.5
UT:LAYTON	5/ 1/81	26140	277.3	73.9
UT:LEHI	10/14/81	4000	-319.3	517.3
UT:LEWISTON	10/28/81	1250	74.9	59.1
UT:LINDON	8/17/81	2700	572.5	68.2
UT:LOGAN	10/27/81	25000	332.6	74.5
UT:MAGNA	7/29/81	12000	351.7	109.3
UT:MANTI	5/22/81	2000	-7.2	101.1
UT:MAPLETON	2/19/82	2400	147.6	73.8
UT:MIDVALE	4/13/81	12000	357.2	71.3
UT:MILFORD	3/11/82	1282	460.2	94.0
UT:MOAB	6/25/81	5300	22.2	88.7
UT:MORGAN	2/24/82	1895	267.4	109.6

TABLE 21 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION pCi/l	± 2s
UT:MT. PLEASANT	5/22/81	2800	184.9	102.0
UT:MURRAY	4/10/81	26900	384.3	111.3
UT:N. SALT LAKE	3/31/81	5700	406.9	46.7
UT:NEPHI	3/ 2/82	3200	176.6	72.0
UT:NO. LOGAN	10/ 2/81	2100	161.4	78.0
UT:OGDEN	8/ 4/81	4000	315.6	78.3
UT:OGDEN	9/29/81	5300	631.2	81.8
UT:OGDEN	8/ 4/81	5300	828.9	439.6
UT:OGDEN	8/ 4/81	3850	796.8	135.0
UT:OREM	8/17/81	55000	452.5	67.6
UT:PANGUITCH	5/ 5/81	1348	327.3	78.4
UT:PAROWAN	5/ 7/81	2000	182.9	91.4
UT:PAYSON	2/19/82	8900	148.0	74.0
UT:PLEASANT GROVE	8/17/81	9000	468.7	70.0
UT:PLEASANT VIEW	8/ 4/81	10000	334.6	76.8
UT:PROVIDENCE CITY	10/27/81	1600	314.9	489.1
UT:RICHFIELD	5/21/81	6000	227.4	124.4
UT:RICHMOND	10/28/81	1661	31.0	57.9
UT:RIVER HEIGHTS	10/27/81	1050	184.7	71.8
UT:RIVERDALE	6/16/81	6000	241.1	63.9
UT:RIVERTON	4/10/81	7500	482.9	80.7
UT:ROOSEVELT	3/15/82	4000	379.2	73.9
UT:ROY	6/17/81	20000	306.8	64.4
UT:SALEM	2/19/82	3000	224.4	76.1
UT:SALINA	5/21/81	2200	-22.5	118.0
UT:SALINA	3/11/82	2230	98.8	83.8
UT:SALT LAKE CITY	4/13/81	2400	257.5	66.8
UT:SALT LAKE CITY	4/13/81	28000	112.3	88.4
UT:SANDY	4/10/81	52000	646.5	80.6
UT:SANDY	4/10/81	7800	711.9	81.8
UT:SANTAQUIN	2/19/82	2175	513.8	77.3
UT:SMITHFIELD	10/28/81	5011	190.2	61.5
UT:SO. OGDEN	6/17/81	10000	35.6	60.4
UT:SO. SALT LAKE	4/13/81	8000	136.2	68.0
UT:SOUTH WEBER	6/17/81	1600	364.3	67.3
UT:SPANISH FORK	2/19/82	10000	445.6	77.9
UT:SPRINGVALE	2/19/82	14000	394.3	78.0
UT:ST. GEORGE	5/ 6/81	7500	-16.8	75.1
UT:SUNSET	6/16/81	6500	156.9	61.5
UT:SYRACUSE	5/11/81	3709	259.0	60.8
UT:TAYLORSVILLE	7/29/81	44000	146.9	104.4
UT:TOOELE	6/ 1/81	4500	153.5	77.5
UT:TOOELE	6/ 1/81	16000	366.9	80.7
UT:TREMONTON	9/29/81	3000	667.0	143.4
UT:WASHINGTON	5/ 6/81	3500	921.3	124.3
UT:WASHINGTON TERR	6/17/81	8200	258.8	64.6
UT:WELLSVILLE	10/27/81	1800	323.5	74.2
UT:WEST POINT	5/11/81	2000	196.9	59.9
UT:WILLARD	9/29/81	1800	728.8	80.2
UT:WOODS CROSS	3/31/81	4274	907.8	49.6

s = SIGMA ERROR (IN PERCENT)

SECTION III. External Gamma Ambient Monitoring Program

The external gamma monitoring program, which began in October 1978, provides a continuous measurement of ambient gamma exposure rates, including cosmic, at selected sites throughout the continental United States. Data from this program will be used to evaluate fluctuations in natural background due to variations in environmental conditions and to provide a means of monitoring any significant increases in ambient gamma levels due to weapons fallout, reactor operations, etc. Initially, the program will consist of approximately 22 sites representing a wide geographic coverage throughout the country. Hopefully, at some later date additional sites will be added to the program. Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of national trends.

The monitoring program utilizes CaF_2:Mn thermoluminescent dosimeters (TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of four TLD's is located at each station or site. Dosimeters are annealed by the station operator prior to positioning in the field. The dosimeters are returned to EERF for readout on an approximate one-month cycle. Several dosimeters are annealed by the station operator as controls and returned with the exposed field dosimeters to correct for any exposures accumulated during shipment.

Results from the period April - June 1982 are shown in Table 22.

TABLE 22

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
AL:MONTGOMERY	40682- 50382	6.8	10.5	11.1
AL:MONTGOMERY	50382- 60382	8.1	10.9	5.4
AL:MONTGOMERY	60382- 70282	7.5	10.7	5.4
CA:BERKELEY	40182- 43082	6.2	8.9	3.5
CA:BERKELEY	43082- 60482	5.0	5.9	7.3
CA:BERKELEY	60482- 70282	3.9	5.8	25.1
CO:DENVER	40182- 50382	11.3	14.7	7.6
CO:DENVER	50382- 60382	10.8	14.6	10.0
CO:DENVER	60382- 63082	9.1	14.0	3.5
FL:ORLANDO	32882- 50582	3.6	3.9	5.7
FL:ORLANDO	50582- 60482	4.1	5.6	19.2
ID:BOISE	40582- 50382	7.7	11.5	6.0
ID:BOISE	50382- 60782	10.0	11.9	7.8
ID:BOISE	60782- 70682	8.2	11.7	4.2
IL:CHICAGO	40682- 50482	4.4	6.6	20.2
IL:CHICAGO	50482- 60482	5.6	7.5	4.7
IL:CHICAGO	60482- 70682	5.3	6.9	5.2
ND:BISMARCK	40282- 51082	8.4	9.2	4.5
ND:BISMARCK	51082- 60482	5.2	8.7	6.2
ND:BISMARCK	60482- 63082	5.2	8.4	5.1
NJ:TRENTON	40182- 43082	6.8	9.8	6.4
NJ:TRENTON	43082- 60382	8.7	10.7	6.6
NJ:TRENTON	60382- 70182	6.9	10.2	8.0
NM:SANTA FE	40582- 51882	15.5	15.0	5.1
NM:SANTA FE	51882- 62282	11.3	13.5	8.6
NV:LAS VEGAS	40182- 42982	4.3	6.5	8.6
NV:LAS VEGAS	42982- 60282	5.6	6.9	4.5
NV:LAS VEGAS	60282- 70182	4.4	6.3	5.7
NY:NEW YORK	40582- 50682	6.3	8.5	5.9
NY:NEW YORK	50682- 60882	5.8	7.3	7.5
NY:NEW YORK	60882- 70882	5.6	7.7	16.2
OH:COLUMBUS	40282- 50382	4.8	6.5	4.9
OH:COLUMBUS	50382- 60282	5.3	7.4	4.0
OH:COLUMBUS	60282- 70182	10.7	15.4	3.9
OK:OKLAHOMA CITY	31882- 42982	8.0	8.0	6.1
OK:OKLAHOMA CITY	42982- 60882	7.5	7.8	5.4
OK:OKLAHOMA CITY	60882- 70682	4.8	7.1	9.4
OR:PORTLAND	40182- 51082	7.3	7.8	8.0
OR:PORTLAND	51082- 60382	4.8	8.3	7.7
OR:PORTLAND	60382- 70782	6.5	8.0	6.3
PA:HARRISBURG	33082- 50382	4.6	5.7	7.1
PA:HARRISBURG	50382- 60182	4.4	6.3	15.3
PA:HARRISBURG	60182- 62982	4.6	6.8	6.4
PA:PITTSBURGH	40282- 50482	9.3	12.1	4.5
PA:PITTSBURGH	50482- 60282	9.8	14.0	3.9
PA:PITTSBURGH	60282- 70282	8.9	12.4	4.9

TABLE 22 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
RI:PROVIDENCE	40582- 51282	8.9	10.1	4.9
RI:PROVIDENCE	51282- 61182	7.7	10.7	5.9
RI:PROVIDENCE	61182- 70982	6.9	10.1	5.4
SC:BARNWELL	40182- 50782	7.8	9.0	5.3
SC:BARNWELL	50782- 60382	2.2	3.5	7.7
SC:BARNWELL	60382- 70182	5.0	7.5	6.5
SC:COLUMBIA	40282- 43082	6.4	9.4	5.3
SC:COLUMBIA	50482- 60182	6.8	10.2	12.0
SC:COLUMBIA	60182- 62982	6.1	9.7	6.5
TN:KNOXVILLE	40282- 42882	6.0	9.6	5.8
TN:KNOXVILLE	42882- 60382	8.1	9.4	4.6
TN:KNOXVILLE	60382- 70182	5.9	8.8	10.4
VA:RICHMOND	40182- 42982	5.7	8.5	7.0
VA:RICHMOND	42982- 60482	6.8	7.9	4.7
VA:RICHMOND	60482- 63082	4.2	6.7	22.1
VT:MONTPELIER	40182- 42982	5.7	8.5	5.6
VT:MONTPELIER	42982- 62882	11.7	8.1	5.8

* s = SIGMA ERROR (IN PERCENT)

SECTION IV. Milk Program

Pasteurized Milk

This is a cooperative program of the EPA, ORP and the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general populations intake of radionuclides since it is consumed by a large segment of the population and contains several of the biologically important contaminants resulting from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at 65 sampling sites with one or more located in each state, Puerto Rico, and the Panama Canal. These are composite samples representing more than 80 percent of the milk consumed in a given population center.

These samples are analyzed for iodine-131, barium-140, cesium-137, and potassium. All 65 samples are analyzed annually in July for strontium-89, and strontium-90. Also, for the first month of the three quarters beginning January, April and October, 10 regional composite samples of milk made up from the states within each of EPA's 10 regions are analyzed for strontium-89 and strontium-90.

Iodine-131, barium-140, cesium-137 and potassium are determined by gamma spectral analysis. Strontium-89 and strontium-90 are determined by beta counting a total strontium precipitate which has been chemically separated by ion-exchange.

The values from the pasteurized milk samples for April - June 1982 are shown in Tables 23 - 25. Strontium values from regional composite samples collected April - June 1982 are shown in Table 26.

Tritium in Milk

It was previously proposed to analyze all 65 milk samples for tritium in the aqueous and organic phases, on an annual basis (on the April sample). The EERF is currently evaluating alternative analytical techniques anticipating that these analyses will begin during the coming year.

Carbon-14 in Milk

Nine stations, chosen for wide geographical distribution, contribute milk samples for annual analysis for carbon-14. These samples have monitored the carbon-14 levels in the food chain resulting from nuclear testing.

Analysis consists of combusting the samples and measuring released carbon dioxide through liquid scintillation.

Data will be published as it becomes available.

TABLE 23

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1982

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AK:ANCHORAGE	4/22/82	1.28 0.22	-2. 15.	-5. 19.	-6. 13.
AL:MONTGOMERY	4/ 8/82	1.25 0.21	2. 15.	-6. 19.	-2. 13.
AR:LITTLE ROCK	4/ 5/82	1.38 0.12	3. 7.	-3. 8.	-2. 7.
AZ:PHOENIX	4/ 6/82	1.33 0.08	-1. 5.	0. 6.	-2. 5.
CA:LOS ANGELES	4/ 5/82	1.24 0.21	10. 15.	-7. 19.	-6. 13.
CA:SACRAMENTO	4/ 2/82	1.45 0.22	6. 15.	-21. 19.	8. 13.
CA:SAN FRANCISCO	4/ 6/82	1.40 0.22	3. 15.	-4. 19.	-1. 13.
CO:DENVER	4/23/82	1.37 0.12	-1. 7.	0. 8.	-1. 7.
CT:HARTFORD	4/12/82	1.26 0.21	-8. 14.	-10. 19.	-2. 13.
DC:WASHINGTON	4/ 2/82	1.35 0.22	-1. 15.	4. 20.	-6. 13.
DE:WILMINGTON	4/15/82	1.20 0.21	2. 15.	4. 20.	3. 13.
FL:TAMPA	4/ 5/82	1.16 0.21	11. 15.	3. 20.	-1. 13.
GA:ATLANTA	4/ 5/82	1.47 0.22	3. 15.	-2. 20.	5. 13.
HI:HONOLULU	4/ 6/82	1.45 0.12	9. 7.	-4. 8.	2. 7.
IA:DES MOINES	4/ 5/82	1.40 0.22	10. 15.	-16. 19.	0. 13.
ID:IDAHO FALLS	4/ 7/82	1.36 0.22	3. 15.	-7. 19.	-2. 13.
IL:CHICAGO	4/ 5/82	1.41 0.12	6. 7.	-5. 8.	-1. 7.
IN:INDIANAPOLIS	4/ 5/82	1.31 0.16	7. 11.	-10. 13.	-4. 9.
KS:WICHITA	4/ 8/82	1.25 0.21	1. 15.	-3. 19.	-1. 13.
KY:LOUISVILLE	4/ 5/82	1.41 0.22	10. 15.	0. 20.	3. 13.
LA:NEW ORLEANS	4/19/82	1.29 0.15	-8. 10.	-21. 13.	-7. 9.
MA:BOSTON	4/ 6/82	1.34 0.22	-6. 15.	-8. 19.	0. 13.
MD:BALTIMORE	4/ 5/82	1.50 0.22	10. 15.	-18. 19.	-5. 13.
ME:PORTLAND	4/ 6/82	1.39 0.16	-2. 11.	-10. 13.	2. 9.
MI:DETROIT	4/ 7/82	1.35 0.22	5. 15.	-16. 19.	-10. 13.
MI:GRAND RAPIDS	4/ 6/82	1.38 0.22	3. 15.	-17. 19.	1. 13.
MN:MINNEAPOLIS	4/ 5/82	1.36 0.22	-2. 15.	0. 20.	-4. 13.
MN:ST. PAUL	4/ 7/82	1.38 0.22	-8. 14.	-7. 19.	-2. 13.
MO:KANSAS CITY	4/ 9/82	1.26 0.21	-3. 15.	-6. 19.	1. 13.
MO:ST. LOUIS	4/ 7/82	1.35 0.22	3. 15.	-1. 20.	-10. 13.
MS:JACKSON	4/ 5/82	1.26 0.21	8. 15.	-9. 19.	3. 13.
MT:HELENA	4/ 6/82	1.18 0.21	-1. 15.	-15. 19.	11. 13.
NC:CHARLOTTE	4/ 5/82	1.26 0.15	3. 11.	-1. 14.	-9. 9.
ND:MINOT	4/19/82	1.25 0.21	-5. 14.	-17. 19.	2. 13.
NE:OMAHA	4/ 9/82	1.26 0.21	-3. 15.	-6. 19.	1. 13.
NH:MANCHESTER	4/ 5/82	1.39 0.12	-1. 7.	-1. 8.	-2. 7.
NV:LAS VEGAS	4/ 7/82	1.53 0.22	0. 15.	-20. 19.	-10. 13.
NY:BUFFALO	4/ 2/82	1.42 0.12	5. 7.	1. 8.	0. 7.
NY:NEW YORK CITY	4/ 5/82	1.44 0.12	8. 7.	-3. 8.	0. 7.
NY:SYRACUSE	4/ 6/82	1.32 0.22	0. 15.	-17. 19.	0. 13.
OH:CINCINNATI	4/ 5/82	1.38 0.22	3. 15.	-16. 19.	4. 13.
OH:CLEVELAND	4/ 7/82	1.27 0.15	7. 11.	-2. 14.	7. 9.
OR:PORTLAND	4/ 5/82	1.40 0.08	4. 5.	0. 6.	-4. 5.
PA:PHILADELPHIA	4/ 5/82	1.51 0.16	-7. 10.	-7. 14.	0. 9.

TABLE 23 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1982

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
PA:PITTSBURGH	4/ 7/82	1.43 0.22	-1. 15.	-14. 19.	-4. 13.
PC:ANCON	4/22/82	1.29 0.12	17. 7.	0. 8.	4. 7.
PR:SAN JUAN	4/20/82	1.25 0.15	-4. 10.	-12. 13.	0. 9.
SC:CHARLESTON	4/27/82	1.28 0.15	12. 11.	-7. 13.	6. 9.
SD:RAPID CITY	4/ 9/82	1.35 0.16	5. 11.	-5. 14.	-4. 9.
TN:CHATTANOOGA	4/ 5/82	1.33 0.22	18. 15.	-11. 19.	6. 13.
TN:KNOXVILLE	4/ 5/82	1.39 0.22	8. 15.	-13. 19.	1. 13.
TN:MEMPHIS	4/28/82	1.35 0.12	3. 7.	0. 8.	-3. 7.
TX:AUSTIN	4/14/82	1.30 0.12	-5. 6.	-1. 8.	-2. 7.
UT:SALT LAKE CITY	4/ 5/82	1.47 0.12	6. 7.	-6. 8.	3. 7.
VA:NORFOLK	4/ 7/82	1.41 0.22	4. 15.	-10. 19.	2. 13.
VT:BURLINGTON	4/ 6/82	1.53 0.22	10. 15.	-27. 19.	1. 13.
WA:SEATTLE	4/ 5/82	1.35 0.12	14. 7.	-3. 8.	1. 7.
WV:CHARLESTON	4/20/82	1.20 0.21	-15. 14.	-14. 19.	-2. 13.
WY:LARAMIE	4/ 5/82	1.45 0.12	-2. 7.	-1. 8.	-1. 7.

NS NO SAMPLE
s SIGMA COUNTING ERROR

TABLE 24

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1982

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	5/ 4/82	1.30 0.22	-1. 15.	-8. 19.	2. 13.
AR:LITTLE ROCK	5/ 5/82	1.43 0.22	-2. 15.	-24. 19.	-13. 13.
AZ:PHOENIX	5/ 5/82	1.45 0.22	-2. 15.	-6. 19.	7. 13.
CA:LOS ANGELES	5/12/82	1.34 0.22	5. 15.	-9. 19.	4. 13.
CA:SACRAMENTO	5/ 3/82	1.37 0.22	10. 15.	-11. 19.	-2. 13.
CA:SAN FRANCISCO	5/ 4/82	1.39 0.22	0. 15.	-12. 19.	-5. 13.
CO:DENVER	5/25/82	1.37 0.22	-1. 15.	-13. 19.	-6. 13.
CT:HARTFORD	5/ 3/82	1.33 0.22	3. 15.	-10. 19.	-1. 13.
DC:WASHINGTON	5/ 7/82	1.35 0.22	1. 15.	-16. 19.	-5. 13.
DE:WILMINGTON	5/ 3/82	1.34 0.16	-1. 11.	-11. 13.	0. 9.
FL:TAMPA	5/ 4/82	1.29 0.22	15. 15.	-12. 19.	-12. 13.
HI:HONOLULU	5/ 4/82	1.30 0.22	-4. 15.	2. 20.	-8. 13.
IA:DES MOINES	5/ 4/82	1.34 0.15	4. 11.	-15. 13.	2. 9.
ID:IDAHO FALLS	5/10/82	1.19 0.21	5. 15.	-18. 19.	-2. 13.
IL:CHICAGO	5/ 3/82	1.34 0.22	5. 15.	-17. 19.	-3. 13.
IN:INDIANAPOLIS	5/ 3/82	1.29 0.22	-3. 15.	-14. 19.	1. 13.
KS:WICHITA	5/ 5/82	1.31 0.22	-4. 15.	-8. 19.	-5. 13.
KY:LOUISVILLE	5/ 3/82	1.38 0.22	6. 15.	-12. 19.	-13. 13.
MA:BOSTON	5/ 4/82	1.28 0.15	-6. 10.	-12. 13.	3. 9.
MD:BALTIMORE	5/ 7/82	1.30 0.22	2. 15.	-4. 19.	-5. 13.
ME:PORTLAND	5/ 7/82	1.37 0.22	3. 15.	-19. 19.	-1. 13.
MI:DETROIT	5/ 6/82	1.26 0.21	2. 15.	-13. 19.	4. 13.
MI:GRAND RAPIDS	5/ 3/82	1.42 0.16	4. 11.	-11. 13.	-5. 9.
MN:MINNEAPOLIS	5/ 3/82	1.41 0.22	-5. 15.	-4. 19.	-7. 13.
MN:ST. PAUL	5/ 5/82	1.41 0.22	-2. 15.	-22. 19.	-5. 13.
MO:ST. LOUIS	5/ 5/82	1.40 0.22	-5. 15.	-14. 19.	1. 13.
MS:JACKSON	5/ 3/82	1.41 0.22	9. 15.	-12. 19.	-4. 13.
MT:HELENA	5/ 3/82	1.49 0.22	-13. 14.	-11. 19.	-13. 13.
NC:CHARLOTTE	5/ 3/82	1.32 0.22	-2. 15.	-11. 19.	1. 13.
NE:OMAHA	5/ 7/82	1.41 0.22	-4. 15.	-21. 19.	5. 13.
NH:MANCHESTER	5/ 3/82	1.31 0.22	4. 15.	-16. 19.	-2. 13.
NJ:TRENTON	5/ 6/82	1.42 0.22	2. 15.	-26. 19.	0. 13.
NM:ALBUQUERQUE	5/ 3/82	1.37 0.16	-5. 10.	-15. 13.	-2. 9.
NV:LAS VEGAS	5/ 5/82	1.42 0.16	4. 11.	-13. 13.	-5. 9.
NY:BUFFALO	5/10/82	1.46 0.22	3. 15.	-11. 19.	0. 13.
NY:NEW YORK CITY	5/ 3/82	1.33 0.22	6. 15.	-22. 19.	-5. 13.
NY:SYRACUSE	5/ 3/82	1.31 0.15	-9. 10.	-7. 13.	-3. 9.
OH:CINCINNATI	5/ 3/82	1.32 0.22	14. 15.	0. 20.	-6. 13.
OH:CLEVELAND	5/10/82	1.49 0.22	15. 15.	-18. 19.	-2. 13.
OK:OKLAHOMA CITY	5/ 2/82	1.30 0.22	-9. 14.	-8. 19.	-3. 13.
OK:OKLAHOMA CITY	5/24/82	1.31 0.12	-2. 7.	-1. 8.	-2. 7.
OR:PORTLAND	5/10/82	1.31 0.22	2. 15.	2. 20.	3. 13.
PA:PHILADELPHIA	5/ 3/82	1.18 0.21	7. 15.	-7. 19.	2. 13.
PA:PITTSBURGH	5/ 5/82	1.37 0.22	12. 15.	-18. 19.	0. 13.

TABLE 24 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1982

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
PC:ANCON	5/27/82	1.35 0.22	15. 15.	-17. 19.	3. 13.
PR:SAN JUAN	5/13/82	1.38 0.22	-6. 15.	-7. 19.	7. 13.
SD:RAPID CITY	5/ 6/82	1.32 0.13	6. 8.	-12. 11.	2. 8.
TN:CHATTANOOGA	5/ 3/82	1.29 0.15	2. 11.	-6. 13.	-2. 9.
TN:KNOXVILLE	5/ 3/82	1.38 0.22	-4. 15.	-7. 19.	-10. 13.
TN:MEMPHIS	5/26/82	1.45 0.22	-1. 15.	-15. 19.	-1. 13.
TX:FT. WORTH	5/24/82	1.33 0.22	1. 15.	-4. 19.	1. 13.
UT:SALT LAKE CITY	5/ 3/82	1.27 0.16	-7. 10.	-4. 13.	3. 9.
VA:NORFOLK	5/ 7/82	1.43 0.22	1. 15.	-5. 19.	-6. 13.
VT:BURLINGTON	5/ 7/82	1.32 0.22	0. 15.	-17. 19.	2. 13.
WA:SEATTLE	5/ 3/82	1.41 0.16	-7. 10.	-9. 13.	-2. 9.
WA:SPOKANE	5/ 4/82	1.41 0.22	11. 15.	-14. 19.	-9. 13.
WI:MILWAUKEE	5/ 7/82	1.24 0.21	-3. 15.	-6. 19.	-8. 13.
WV:CHARLESTON	5/26/82	1.19 0.21	4. 15.	-17. 19.	-8. 13.
WY:LARAMIE	5/ 3/82	1.43 0.22	0. 15.	-5. 19.	-10. 13.

NS NO SAMPLE
s SIGMA COUNTING ERROR

TABLE 25

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1982

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AK:ANCHORAGE	6/ 1/82	1.41 0.16	-2. 11.	-6. 14.	-8. 9.
AL:MONTGOMERY	6/ 2/82	1.36 0.22	3. 15.	3. 20.	-6. 13.
AR:LITTLE ROCK	6/ 7/82	1.36 0.22	4. 15.	-14. 19.	-9. 13.
AZ:PHOENIX	6/10/82	1.47 0.22	6. 15.	-38. 25.	-7. 13.
CA:LOS ANGELES	6/15/82	1.34 0.15	-6. 10.	-22. 13.	0. 9.
CA:SACRAMENTO	6/ 1/82	1.39 0.22	-2. 15.	-17. 19.	-4. 13.
CA:SAN FRANCISCO	6/ 3/82	1.33 0.22	4. 15.	3. 20.	-10. 13.
CO:DENVER	6/25/82	1.52 0.22	2. 15.	-22. 19.	-5. 13.
CT:HARTFORD	6/ 7/82	1.36 0.22	1. 15.	-17. 19.	-13. 13.
DC:WASHINGTON	6/ 4/82	1.48 0.22	4. 15.	-17. 19.	-7. 13.
DE:WILMINGTON	6/ 2/82	1.26 0.22	-12. 14.	6. 20.	-7. 13.
FL:TAMPA	6/ 2/82	1.44 0.22	12. 15.	-15. 19.	-7. 13.
GA:ATLANTA	6/ 9/82	1.25 0.21	3. 15.	-6. 19.	-8. 13.
HI:HONOLULU	6/ 1/82	1.51 0.22	9. 15.	-20. 19.	0. 13.
IA:DES MOINES	6/ 1/82	1.33 0.22	-2. 15.	-3. 19.	3. 13.
ID:IDAHO FALLS	6/ 2/82	1.42 0.22	2. 15.	-10. 19.	-5. 13.
IL:CHICAGO	6/ 7/82	1.44 0.22	-2. 15.	-20. 19.	-6. 13.
KS:WICHITA	6/ 7/82	1.30 0.15	0. 10.	-22. 13.	-4. 9.
KY:LOUISVILLE	6/ 7/82	1.32 0.22	12. 15.	-14. 19.	-11. 13.
LA:NEW ORLEANS	6/22/82	1.41 0.22	0. 15.	-14. 19.	-5. 13.
MA:BOSTON	6/ 8/82	1.34 0.22	4. 15.	-3. 19.	-10. 13.
MD:BALTIMORE	6/ 4/82	1.39 0.22	-7. 15.	8. 20.	-7. 13.
ME:PORTLAND	6/ 8/82	1.42 0.22	3. 15.	-9. 19.	-5. 13.
MI:DETROIT	6/10/82	1.33 0.15	-3. 10.	-15. 13.	4. 9.
MI:GRAND RAPIDS	6/15/82	1.38 0.22	3. 15.	-16. 19.	-16. 13.
MN:MINNEAPOLIS	6/ 7/82	1.36 0.22	-1. 15.	-7. 19.	-8. 13.
MN:ST. PAUL	6/ 1/82	1.35 0.15	-4. 10.	-16. 13.	-3. 9.
MN:ST. PAUL	6/30/82	1.19 0.21	-8. 14.	-12. 19.	0. 13.
MO:KANSAS CITY	6/11/82	1.26 0.21	-3. 15.	-12. 19.	-10. 13.
MO:ST. LOUIS	6/ 2/82	1.25 0.21	10. 15.	-5. 19.	-1. 13.
MS:JACKSON	6/ 7/82	1.41 0.22	-10. 14.	-11. 19.	-6. 13.
MT:HELENA	6/10/82	1.56 0.16	1. 11.	-15. 13.	-6. 9.
NC:CHARLOTTE	6/ 7/82	1.40 0.22	-1. 15.	-25. 19.	-11. 13.
ND:MINOT	6/17/82	1.42 0.22	-3. 15.	-10. 19.	-6. 13.
NE:OMAHA	6/11/82	1.23 0.21	2. 15.	-39. 22.	-8. 13.
NH:CONCORD	6/ 7/82	1.33 0.16	9. 11.	-23. 13.	-5. 9.
NJ:TRENTON	6/ 3/82	1.34 0.22	-1. 15.	0. 20.	-8. 13.
NM:ALBUQUERQUE	6/ 7/82	1.24 0.21	7. 15.	-9. 19.	-2. 13.
NV:LAS VEGAS	6/ 8/82	1.49 0.22	1. 15.	-42. 26.	-6. 13.
NY:BUFFALO	6/ 1/82	1.43 0.16	0. 11.	-16. 13.	-4. 9.
NY:NEW YORK CITY	6/ 7/82	1.23 0.21	2. 15.	-14. 19.	-7. 13.
NY:SYRACUSE	6/ 3/82	1.24 0.21	6. 15.	-5. 19.	-6. 13.
OH:CINCINNATI	6/ 1/82	1.29 0.22	-5. 14.	-13. 19.	-5. 13.
OH:CLEVELAND	6/ 7/82	1.54 0.22	2. 15.	-10. 19.	-10. 13.

TABLE 25 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1982

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
OR:PORTLAND	6/ 7/82	1.35 0.22	8. 15.	-20. 19.	-6. 13.
PA:PHILADELPHIA	6/ 7/82	1.32 0.16	0. 11.	-15. 13.	-3. 9.
PA:PITTSBURGH	6/ 9/82	1.60 0.22	5. 15.	-17. 19.	-8. 13.
PC:ANCON	6/24/82	1.44 0.22	6. 15.	-18. 19.	-17. 13.
PR:SAN JUAN	6/17/82	1.53 0.22	-11, 14.	-10. 19.	4. 13.
SC:CHARLESTON	6/22/82	1.45 0.22	-5. 14.	-27. 19.	-2. 13.
SD:RAPID CITY	6/ 3/82	1.51 0.22	5. 15.	-12. 19.	-8. 13.
TN:CHATTANOOGA	6/ 7/82	1.34 0.22	-4. 15.	-21. 19.	4. 13.
TN:KNOXVILLE	6/ 7/82	1.38 0.16	0. 11.	-11. 13.	-6. 9.
TN:MEMPHIS	6/30/82	1.24 0.21	2. 15.	-15. 19.	-3. 13.
TX:AUSTIN	6/ 7/82	1.51 0.16	-7. 10.	-8. 13.	-12. 9.
UT:SALT LAKE CITY	6/ 8/82	1.24 0.21	7. 15.	-34. 22.	-8. 13.
VA:NORFOLK	6/ 4/82	1.50 0.22	9. 15.	-14. 19.	0. 13.
VT:BURLINGTON	6/ 4/82	1.35 0.22	9. 15.	-15. 19.	-2. 13.
WA:SEATTLE	6/ 7/82	1.27 0.22	-5. 15.	-4. 19.	-11. 13.
WA:SPOKANE	6/ 7/82	1.29 0.22	4. 15.	-17. 19.	-8. 13.
WI:MILWAUKEE	6/ 2/82	1.33 0.22	10. 15.	-13. 19.	-9. 13.
WY:LARAMIE	6/ 7/82	1.21 0.21	1. 15.	-4. 19.	-6. 13.

NS NO SAMPLE
s SIGMA COUNTING ERROR

TABLE 26

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

EPA REGIONAL COMPOSITES

APRIL - JUNE 1982

EPA REGION	^{90}Sr pCi/l $\pm$ 2s	^{89}Sr pCi/l $\pm$ 2s*
I	1.9 0.8	2. 1.
II	2.2 0.9	0. 0.
III	2.9 1.1	1. 0.
IV	1.8 0.6	2. 1.
V	3.4 1.6	0. 0.
VI	3.5 1.2	0. 0.
VII	2.5 0.9	1. 0.
VIII	3.5 1.9	-1. 1.
IX	1.0 0.8	0. 0.
X	1.8 1.2	0. 0.

s SIGMA COUNTING ERROR
s* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

Radiological Health Laboratory
Indiana State Board of Health

Indiana Milk Analysis Program

In order to evaluate the fallout on Indiana pasturelands, the State has implemented a program whereby monthly milk samples from five geographical areas are sent to the Radiological Health Laboratory of the State Board of Health. The milk in these samples is bottled on the same date in all five areas to provide uniform time from pasture to the lab.

Once in the laboratory, the milk is first analyzed by gamma spectroscopy for iodine-131, barium-140, cesium-137, and potassium-40. A one gallon sample is analyzed on a 3" x 3" NaI(Tl) scintillation crystal for 4800 seconds. A background sample of 48,000 seconds is also run. The data are analyzed to give pCi/l for each radionuclide.

A quarterly composite sample is saved and run for strontium-89 and -90 by ion exchange method.

As data is received it will be published.

Radiological Health Division
State Hygienic Laboratory of Iowa

Iowa Water Sampling Program

The radiological Health Division of the State Hygienic Laboratory of Iowa with the assistance of the State Department of Environmental Quality (DEQ) maintains a state-wide water sampling program of community drinking waters, surface waters and precipitation. All analyses with the exception of the sequential Ra-226, -228 analyses are performed according to "Standard Methods for the Examination of Water and Wastewater", 14th edition. The sequential analyses for radiums are performed according to the EPA publication, EPA-600/4-75-008, "Interim Radiochemical Methodology for Drinking Water."

The drinking water samples are collected by DEQ regional personnel and sent to the State Hygienic Laboratory where they are preserved with HCl. These waters are analyzed for gross alpha and gross beta radioactivity as a screening process. Subsequent analyses for Ra-226, Ra-228, Sr-90 are performed if screening levels are exceeded. Radium levels are of primary concern in Iowa drinking waters as those levels are elevated in deep geologic aquifers within the state.

Surface waters are collected at eleven sites throughout the state with site selection being determined by proximity upstream and downstream to nuclear power plants in Iowa or those plants discharging into rivers which are natural borders with adjoining states. Gross alpha, gross beta, and tritium are the routine radionuclide analyses for these samples. Strontium is of interest when gross beta screening levels are exceeded or if nuclear weapons testing necessitates monitoring to determine its impact on the environment.

Background Radiation Levels, Tritium, for the third quarter, 1981, are shown in Table 27.

Background radiation levels, tritium, Iowa city precipitation are shown in Table 28.

Gross Radiation in Precipitation for the third quarter, 1981, is shown in Table 29.

Gross Activity in Surface Water reported as pCi/l for the third quarter, 1981, is shown in Table 30.

Gross Beta Activity in Air for the third quarter, 1981 is shown in Table 31.

SDWA (Safe Drinking Water Act) analyses for April, May and June, 1981, are shown in Tables 32, 33, and 34 respectively.

SDWA Radiological analyses, third quarter recheck samples, for 1981 are shown in Table 35.

DEQ Mineral Samples for July and September 1981 are shown in Tables 36 and 37 respectively.

The concentrations of Sr-90 in Iowa Milk Samples are shown in Table 38.

Table 27

UNIVERSITY HYGIENIC LABORATORY
STATEWIDE DYNAMIC SURFACE WATER REPORT
Background Radiation Level, Tritium
Radiation Reported as nCi/l

Data for 3rd Quarter 1981

River	City	Dates Collected Composite Samples	Date Counted	^{3}H Activity nCi/l
Cedar	Cedar Rapids	7-7, 15, 23, 28-81	10-22-81	<1.29
	Cedar Rapids	8-4, 11, 18, 25-81	10-22-81	<1.29
	Cedar Rapids	9-1, 8, 16, 29-81	10-22-81	<1.29
	Vinton	7-7, 13, 20, 28-81	10-22-81	<1.29
	Vinton	8-3, 10, 18, 24-81	10-22-81	<1.29
	Vinton	9-8, 14, 21, 28-81	10-22-81	<1.29
Iowa	Iowa City	7-1-81	10-22-81	<1.29
	Iowa City	8-3-81	10-22-81	<1.29
	Iowa City	9-1-81	10-22-81	<1.29
Mississippi	Davenport	7-6, 16, 21, 30-81	10-22-81	<1.29
	Davenport	8-5, 13, 20, 27-81	10-22-81	<1.29
	Davenport	9-3, 10, 17, 24-81	10-22-81	<1.29
	Dubuque	7-2, 9, 17, 24, 31-81	10-22-81	<1.29
	Dubuque	8-7, 13, 20, 28-81	10-22-81	<1.29
	Dubuque	9-3, 10, 17, 24-81	10-22-81	<1.29
	Lansing	7-14, 21-81	10-22-81	<1.29
	Lansing	8-3, 10, 17, 24, 31-81	10-22-81	<1.29
	Lansing	9-21-81	10-22-81	<1.29
Missouri	Council Bluffs	7-6, 20, 27-81	10-22-81	<1.29
	Council Bluffs	8-6, 10, 20, 25-81	10-22-81	<1.29
	Council Bluffs	9-1, 8, 17, 22, 28-81	10-22-81	<1.29
	Sioux City	7-6, 13, 20, 27-81	10-22-81	<1.29
	Sioux City	8-3, 10, 17, 24, 31-81	10-22-81	<1.29
	Sioux City	9-8, 21, 28-81	10-22-81	<1.29
Nishnabotna	Hamburg	7-8-81	10-22-81	<1.29
	Hamburg	8-18-81	10-22-81	<1.29
	Hamburg	9-8-81	10-22-81	<1.29
Skunk	Ames	8-6, 13, 20-81	10-22-81	<1.29
	Ames	9-3, 10, 16-81	10-22-81	<1.29

Table 28

UNIVERSITY HYGIENIC LABORATORY
STATEWIDE DYNAMIC SURFACE WATER REPORT
Background Radiation Levels, Tritium

Data for 3rd Quarter 1981

IOWA CITY PRECIPITATION

Date Collected	Date Counted	^{3}H Activity, nCi/l
07-14-81	10-22-81	<1.29
07-15-81	10-22-81	<1.29
07-23-81	10-22-81	<1.29
07-27-81	10-22-81	<1.29
07-28-81	10-22-81	<1.29
08-03-81	10-22-81	<1.29
08-07-81	10-22-81	<1.29
08-14-81	10-22-81	<1.29
08-31-81	10-22-81	<1.29
09-08-81	10-22-81	<1.29
09-25-81	10-22-81	<1.29
09-28-81	10-22-81	<1.29

Table 29

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
IOWA CITY PRECIPITATION
GROSS RADIATION

Data for July, August, September 1981

RADIATION #	DATE SAMPLED	AMOUNT PRECIPITATION mm	WATER COLLECTED l	ACTIVITY IN pCi/l ALPHA (DS)	ACTIVITY IN pCi/l BETA-GAMMA (DS)
18386	07-14-81	3.7	0.5	0.1	27
18390	07-15-81	21.3	3.2	<0.1	6
18407	07-23-81	3.3	0.5	0.7	11
18410	07-28-81	13.3	2.0	0.1	3
18411	07-27-81	28.7	4.3	<0.1	2
18439	08-03-81	19.3	2.9	<0.2	3
18443	08-07-81	32 0	4.8	<0.2	3
18456	08-14-81	30.0	4.5	0.3	4
18495	08-31-81	5.7	0.8	0.4	9
18525	09-08-81	13.3	2.0	<0.1	2
18569	09-25-81	23.3	3.5	0.7	12
18570	09-28-81	46.7	7.0	<0.1	1
		Highest		0.7	27
		Lowest		<0.1	1
		Average of 12		0.2	7
		Total amount collected	36.0		

Table 30

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for July, August, September 1981

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		SKUNK RIVER AT AMES					
18442	08-06-81	3.6	3.1	0.5	3	3	Nil
18454	08-13-81	2.0	2.0	Nil	5	5	Nil
18483	08-20-81	0.8	0.3	0.5	12	10	2
18527	09-03-81	5.7	2.9	2.8	11	10	1
18542	09-10-81	2.3	2.3	Nil	9	8	1
18553	09-16-81	2.6	1.1	1.5	4	3	1
	Average of 6	2.8	1.9	0.9	8	7	1
		CEDAR RIVER AT CEDAR RAPIDS					
18382	07-07-81	1.5	1.4	0.1	5	5	Nil
18395	07-15-81	2.5	1.9	0.6	2	2	Nil
18408	07-23-81	5.3	1.2	4.1	12	4	8
18436	07-28-81	3.8	1.9	1.9	5	3	2
18446	08-04-81	2.3	1.0	1.3	6	4	2
18452	08-11-81	0.8	0.5	0.3	7	4	3
18478	08-18-81	1.4	1.2	0.2	6	3	3
18502	08-25-81	1.8	0.9	0.9	6	3	3
18528	09-01-81	0.9	Nil	0.9	10	6	4
18540	09-08-81	2.5	1.6	0.9	7	5	2
18550	09-16-81	1.6	1.1	0.5	5	4	1
18583	09-29-81	1.5	1.5	Nil	2	2	Nil
	Average of 12	2.1	1.2	0.9	6	4	2

Table 30 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for July, August, September 1981

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		MISSOURI RIVER AT COUNCIL BLUFFS					
18379	07-06-81	5.5	2.5	3.0	14	9	5
18402	07-20-81	2.6	2.6	Nil	7	7	Nil
18412	07-27-81	2.7	1.9	0.8	7	7	Nil
18465	08-06-81	5.0	2.6	2.4	10	8	2
18451	08-10-81	2.0	1.4	0.6	8	7	1
18480	08-20-81	2.4	2.4	Nil	9	6	3
18497	08-25-81	3.7	2.1	1.6	11	7	4
18547	09-01-81	1.8	1.5	0.3	11	10	1
18548	09-08-81	2.4	2.1	0.3	13	11	2
18559	09-17-81	7.0	6.0	1.0	3	3	Nil
18564	09-22-81	3.9	3.1	0.8	Nil	Nil	Nil
18575	09-28-81	0.9	0.9	Nil	4	4	Nil
	Average of 12	3.3	2.4	0.9	8	6	2
		MISSISSIPPI RIVER AT DAVENPORT					
18380	07-06-81	1.2	0.3	0.9	Nil	Nil	Nil
18396	07-16-81	0.2	0.2	Nil	1	1	Nil
18405	07-21-81	0.8	0.8	Nil	1	1	Nil
18438	07-30-81	0.3	0.1	0.2	4	4	Nil
18441	08-05-81	0.9	0.9	Nil	4	4	Nil
18455	08-13-81	0.9	0.6	0.3	5	4	1
18484	08-20-81	1.5	0.2	1.3	4	4	Nil
18506	08-27-81	0.4	Nil	0.4	8	5	3
18532	09-03-81	0.9	0.5	0.4	12	5	7
18541	09-10-81	1.4	Nil	1.4	7	6	1
18549	09-17-81	2.8	1.7	1.1	6	4	2
18576	09-24-81	1.3	0.9	0.4	Nil	Nil	Nil
	Average of 12	1.0	0.5	0.5	4	3	1

Table 30 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for July, August, September 1981

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		MISSISSIPPI RIVER AT DUBUQUE					
18365	07-02-81	0.8	0.4	0.4	3	2	1
18384	07-09-81	Nil	Nil	Nil	3	3	Nil
18397	07-17-81	0.9	0.9	Nil	2	2	Nil
18413	07-24-81	0.5	0.5	Nil	3	3	Nil
18435	07-31-81	1.3	1.1	0.2	3	3	Nil
18447	08-07-81	1.4	1.4	Nil	2	2	Nil
18453	08-13-81	1.1	0.8	0.3	2	2	Nil
18482	08-20-81	0.9	0.9	Nil	7	5	2
18496	08-28-81	1.5	0.7	0.8	4	4	Nil
18526	09-03-81	2.2	1.4	0.8	9	6	3
18543	09-10-81	1.8	1.3	0.5	5	3	2
18561	09-17-81	0.7	0.7	Nil	1	1	Nil
18573	09-24-81	0.5	Nil	0.5	2	2	Nil
	Average of 13	1.0	0.8	0.2	4	3	1
		NISHNABOTNA RIVER AT HAMBURG					
18383	07-08-81	1.0	0.8	0.2	10	9	1
18481	08-18-81	2.0	1.5	0.5	10	8	2
18533	09-08-81	1.9	1.6	0.3	7	4	3
	Average of 3	1.6	1.3	0.3	9	7	2
		IOWA RIVER AT IOWA CITY					
18361	07-01-81	2.1	1.9	0.2	5	5	Nil
18560	08-03-81	Nil	Nil	Nil	8	7	1
18501	09-01-81	4.2	3.6	0.6	7	5	2
	Average of 3	2.1	1.8	0.3	7	6	1

Table 30 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for July, August, September 1981

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		MISSISSIPPI RIVER AT LANSING					
18389	07-14-81	Nil	Nil	Nil	3	3	Nil
18406	07-21-81	0.9	0.9	Nil	4	4	Nil
18437	08-03-81	1.2	1.1	0.1	4	4	Nil
18448	08-10-81	0.9	0.4	0.5	3	3	Nil
18469	08-17-81	1.1	0.7	0.4	5	4	1
18488	08-24-81	1.3	1.1	0.2	5	5	Nil
18500	08-31-81	0.4	0.1	0.3	5	5	Nil
18558	09-21-81	2.8	1.9	0.9	4	3	1
	Average of 8	1.1	0.8	0.3	4	4	Nil
		MISSOURI RIVER AT SIOUX CITY					
18377	07-06-81	2.4	2.3	0.1	13	11	2
18388	07-13-81	3.2	2.7	0.5	5	5	Nil
18404	07-20-81	8.9	8.9	Nil	1	1	Nil
18416	07-27-81	3.2	3.2	Nil	9	8	1
18440	08-03-81	1.7	1.7	Nil	10	6	4
18450	08-10-81	3.4	2.6	0.8	6	4	2
18464	08-17-81	3.5	3.0	0.5	7	7	Nil
18486	08-24-81	2.0	1.2	0.8	10	8	2
18503	08-31-81	Nil	Nil	Nil	10	8	2
18530	09-08-81	1.6	0.6	1.0	9	8	1
18545	09-14-81	1.4	0.6	0.8	10	8	2
18557	09-21-81	2.0	1.5	0.5	4	4	Nil
18574	09-28-81	1.4	0.6	0.8	Nil	Nil	Nil
	Average of 13	2.7	2.2	0.5	7	6	1

Table 30 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for July, August, September 1981

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	DS	SS	BETA-GAMMA ACTIVITY TS	DS	SS
		CEDAR RIVER AT VINTON					
18378	07-07-81	3.1	1.3	1.8	3	1	2
18387	07-13-81	0.9	0.9	Nil	1	1	Nil
18403	07-20-81	1.1	1.1	Nil	3	3	Nil
18415	07-28-81	0.7	0.3	0.4	6	6	Nil
18434	08-03-81	2.0	1.8	0.2	5	5	Nil
18449	08-10-81	0.8	Nil	0.8	7	5	2
18468	08-18-81	1.8	1.3	0.5	8	5	3
18487	08-24-81	0.9	0.8	0.1	3	2	1
18499	08-31-81	3.4	1.5	1.9	7	5	2
18529	09-08-81	1.8	0.8	1.0	6	4	2
18544	09-14-81	1.5	0.4	1.1	7	5	2
18556	09-21-81	1.8	1.1	0.7	3	2	1
18572	09-28-81	0.5	0.1	0.4	4	4	Nil
	Average of 13	1.6	0.9	0.7	5	4	1

Table 31

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
3RD QUARTER 1981

July, August, September 1981

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
	AMES		
265357	07-15-81	1416.0	0.03
1353706	07-21-81	1457.3	0.09
1353707	07-27-81	1615.0	0.04
1353708	08-02-81	1618.8	0.02
1353969	08-08-81	1668.0	0.06
1353970	08-14-81	1687.5	0.06
1353971	08-20-81	1821.7	0.07
1353973	08-26-81	1438.9	0.06
1353709	09-13-81	1334.9	0.09
1354263	09-19-81	1390.7	0.07
1354264	09-25-81	1462.8	0.03
		Average of 11	0.06
	COUNCIL BLUFFS		
1016546	07-09-81	1613.7	0.17
1353756	07-15-81	1594.7	0.05
1353752	07-21-81	1640.3	0.13
1353751	07-27-81	1686.2	0.03
1353745	08-02-81	1657.4	0.02
1353739	08-08-81	1644.9	0.09
1354030	08-14-81	1655.5	0.06
1354014	08-20-81	1685.4	0.11
1354007	08-26-81	1672.1	0.05
1354018	09-01-81	1702.8	0.01
1354370	09-07-81	1663.8	0.05
1354374	09-13-81	1639.5	0.07
1354378	09-19-81	1636.4	0.08
1354298	09-25-81	1564.7	0.05
		Average of 14	0.07
	DAVENPORT		
1353646	07-03-81	1583.6	0.12
1353873	07-09-81	1498.2	0.16
1353882	07-15-81	1457.6	0.13
1353878	07-21-81	1456.6	0.08
1353877	07-27-81	1479.6	0.06
1354207	08-02-81	1617.8	0.05
1354200	08-14-81	1648.7	0.07
1354189	08-20-81	1594.3	0.06
1354182	08-26-81	1448.8	0.05
1354464	09-01-81	1496.6	0.03
1354488	09-07-81	1508.7	0.08
1354480	09-13-81	1533.2	0.05
1354475	09-19-81	1505.1	0.05
1354469	09-25-81	1551.9	0.07
		Average of 14	0.08

Table 31 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
3RD QUARTER 1981

July, August, September 1981

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
	DUBUQUE		
1016576	07-03-81	1583.9	0.15
1016577	07-09-81	1650.9	0.18
1016578	07-15-81	1655.1	0.12
1016579	07-21-81	1708.5	0.08
1016580	07-27-81	1714.5	0.07
1353782	08-02-81	1645.0	0.05
1353783	08-08-81	1583.8	0.08
1353784	08-14-81	1706.1	0.06
1353785	08-20-81	1706.8	0.06
1353786	08-26-81	1595.1	0.05
1354057	09-01-81	1670.4	0.03
1354058	09-07-81	1722.1	0.05
1354059	09-13-81	1686.2	0.06
1354060	09-19-81	1710.8	0.06
1354062	09-25-81	1725.2	0.05
		Average of 15	0.08
	MASON CITY		
1015362	07-03-81	1827.2	0.10
1353923	07-09-81	1791.7	0.12
1353844	07-15-81	1775.4	0.04
1353831	07-21-81	1748.0	0.09
1353839	07-27-81	1772.0	0.06
1016639	08-02-81	1619.6	0.04
1016634	08-08-81	1741.7	0.06
1353833	08-14-81	1855.1	0.03
1354141	08-20-81	1889.6	0.06
1354136	08-26-81	1826.5	0.02
1354122	09-01-81	1810.7	0.02
1354386	09-07-81	1918.1	0.05
1354143	09-13-81	1909.8	0.05
1354132	09-19-81	1797.2	0.05
1354403	09-25-81	1843.3	0.05
		Average of 15	0.06

Table 31 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
3RD QUARTER 1981

July, August, September 1981

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
	OTTUMWA		
1353630	07-03-81	1766.9	0.09
1353631	07-09-81	1728.7	0.16
1353632	07-15-81	1791.8	0.04
1353633	07-21-81	1809.0	0.09
1353901	07-27-81	1870.5	0.02
1353903	08-02-81	1768.8	0.07
1353904	08-08-81	1729.4	0.07
1353906	08-14-81	1437.6	0.06
1353907	08-20-81	1784.3	0.07
1354166	08-26-81	1850.2	0.05
1354167	09-01-81	1860.4	0.03
1354168	09-07-81	1857.8	0.05
1354169	09-13-81	1814.3	0.07
1354170	09-19-81	1864.0	0.05
1354496	09-25-81	1866.7	0.06
		Average of 15	0.07
	SIOUX CITY		
1353671	07-03-81	1734.6	0.07
1353672	07-09-81	1748.3	0.11
1353936	07-15-81	1768.1	0.06
1353867	07-21-81	1774.2	0.11
1353866	07-27-81	1806.7	0.06
1353861	08-02-81	2931.0	0.02
1354229	08-08-81	1739.5	0.08
1354226	08-14-81	1765.8	0.04
1354222	08-20-81	1749.7	0.10
1354218	08-26-81	1782.9	0.07
1354213	09-01-81	1795.1	0.02
1354573	09-07-81	1708.4	0.04
1354446	09-13-81	1688.2	0.06
1354449	09-19-81	1746.3	0.09
1354453	09-25-81	1853.0	0.05
		Average of 15	0.07

Table 31 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
3RD QUARTER 1981

July, August, September 1981

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
		WATERLOO	
1015894	07-03-81	1763.2	0.11
1015895	07-09-81	1780.3	0.11
1015896	07-15-81	1766.2	0.09
1016141	07-21-81	1769.2	0.09
1016142	07-27-81	1794.7	0.05
1016143	08-02-81	1764.6	0.05
1016144	08-08-81	1722.7	0.09
1016145	08-14-81	1711.1	0.06
1016146	08-20-81	1748.8	0.08
1016147	08-26-81	1771.0	0.04
1016148	09-01-81	1781.1	0.003
1016149	09-07-81	1781.6	0.01
1016150	09-13-81	1772.2	0.05
1354240	09-19-81	1698.2	0.07
1354239	09-25-81	1753.0	0.06
		Average of 15	0.06

Table 32

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for July 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL # OR RADIATION #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
* Leighton	Mahaska	Well #4, 220'	14981A	05-19-80 08-26-80 12-15-80 03-30-81	2.8	40	0.5	<0.6
Oelwein	Fayette	Well #59, 1325'	15067A	05-14-79 05-23-80 08-22-80 11-25-80	4.2	10	2.2	1.6
Clemons	Marshall	Well #1, 57'	15075A	09-09-80 12-15-80 03-23-81 06-29-81	2.3	4	<0.2	<0.6
Griswold	Cass	Well #3, 96'	15256A	09-09-80 12-08-80 03-16-81 07-06-81	1.1	<0.6		
Badger	Webster	Well #2, 240'	15321A	06-03-79 01-14-80 04-15-80 09-23-80	14	Nil	0.7	<0.6
Klemme	Hancock	Well #1, 1512'	15379A	09-16-80 12-18-80 03-23-81 06-29-81	5.2	8	3.4	2.6

Table 32 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for July 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL # OR RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Auburn	Sac	Well #3, 250'	15564A	10-15-79 04-02-80 06-16-80 12-15-80	7.9	7	<0.2	1.3
Logan	Harrison	Well 60'	15855A	02-11-80 05-12-80 09-15-80 12-08-80	8.7	15	0.2	1.5
Little Rock	Lyon	Well #1, 22'	15883A	02-19-80 06-30-80 09-10-80 12-09-80	5.3	11	0.2	0.8
Blairsburg	Hamilton	2 Wells	15886A	09-09-80 12-08-80 03-23-81 07-06-81	0.3	Nil		
Treynor	Pottawattamie	Well #1 & 2, 250'	15919A	03-04-80 06-16-80 09-09-80 12-04-80	2.0	<0.4	0.5	1.8
Monticello	Jones	Well #1, 1500', Nancy Marty, Owner, Monti-View Mobile Home Park, R.R. #3, Monticello, IA 52310	R15881	03-12-80 08-12-80 01-19-81 04-14-81	2.4	20	<0.2	<0.6

Table 32 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for July 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL # OR RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Hubbard	Hardin	Well #2, 380'	R15900	03-10-80 06-10-80 09-05-80 12-08-80	2.7	1	1.0	0.8
Pisgah	Harrison	Well #1, 135'	R15905	03-25-80 06-25-80 10-21-80 03-03-81	4.5	13	0.4	0.8
Havelock	Pocahontas	Well #3, 177'	R16180	04-28-80 07-28-80 11-24-80 03-19-81	2.7	7	1.1	1.2
* Callender	Webster	Well #3, 2050'	R16181	04-22-80 08-11-80 12-09-80 03-25-81	16	34	5.6	2.9
Oto	Woodbury	Well #1	R16258	05-27-80 09-09-80 12-16-80 03-23-81	2.1	8	0.4	1.9
LeClaire	Scott		R16262	05-08-80 08-19-80 11-26-80 03-27-81	6.9	1	<0.2	1.0

Table 32 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for July 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL # OR RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Webster City	Hamilton	Well #1 & 5, 2005'	R16277	04-28-80 07-29-80 11-05-80 02-12-81	3.3	15	0.8	<0.6
Lime Springs	Howard	Well #1, 100', Davis Corner KOA Kampground, R.R. #3, Lime Springs, IA 52155	R16315	06-02-80 11-03-80 03-13-81 06-17-81	0.9	Nil		
Radcliffe	Hardin		R16321	05-06-80 08-12-80 12-04-80 03-23-81	11	3	0.5	<0.6
Struble	Plymouth	Well #1, 55'	R16435	05-21-80 09-20-80 12-22-80 03-30-81	4.8	10	0.2	0.7
Blanchard	Page		R16530	07-05-80 10-25-80 02-23-81 06-10-81	0.2	Nil		
Clare	Webster	Well #1, 232'	R16579	06-24-80 09-30-80 01-26-81 04-27-81	5.5	14	0.9	1.2

Table 32 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for July 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL # OR RADIATION #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Ashton	Osceola	Well #1, 55'	R16655	07-28-80 12-01-80 03-16-81 06-29-81	<0.1	2		
Dubuque	Dubuque	Well #1, Robert G. Steichen, Sun Valley Water Corp., 3040 Arbor Oaks Drive, Dubuque, IA 52001	R16669	07-28-81 11-17-80 03-17-81 06-22-81	0.9	Nil		
Fort Dodge	Webster	Gary L. Reynolds, R.R. #2, Timberland, Fort Dodge, IA 50501	R16701	08-05-80 11-18-80 03-03-81 06-22-81	<0.1	7		
Ida Grove	Ida	Well #1, 2, 3, Avg. 65'	R16702	07-28-80 10-29-80 01-29-81 04-30-81	2.0	4	<0.3	0.8
Stout	Grundy		R16743	08-05-80 11-20-80 03-02-81 06-24-81	0.7	3		
Low Moor	Clinton	Well #2, 200'	R16858	09-08-80 12-15-80 03-23-81 06-22-81	0.6	1		

Table 32 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for July 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL # OR RADIATION #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Superior	Dickinson	Well #1, 105'	R16914	09-22-80 12-22-80 03-25-81 06-22-81	1.2	9		
Gowrie	Webster		R17001	09-23-80 01-12-81 04-06-81 07-13-81	<0.2	3		
Cherokee	Cherokee		R17008	09-22-80 12-22-80 03-30-81 07-06-81	1.7	6		
Marshalltown	Marshall		R17009	09-19-80 12-22-80 03-24-81 07-01-81	1.7	4		
Mediapolis	Des Moines	All 5 wells	R17010	09-19-80 12-18-80 03-25-81 06-18-81	6.2	18	0.7	<0.6
Bellevue	Jackson	Well #2, 1500'	R17013	09-29-80 01-09-81 04-02-81 06-29-81	5.0	12	3.9	3.4

Table 32 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for July 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL # OR RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Whiting	Monona	Well #2, 95'	R17015	09-24-80 12-21-80 03-23-81 06-22-81	0.4	5		
Walcott	Scott	Well #3, 130'	R17017	09-19-80 12-29-80 04-06-81 07-09-81	0.3	<0.6		
Clutier	Tama	Well #1, 290'	R17018	09-23-80 12-18-80 03-30-81 06-30-81	1.9	1		
Jd	Floyd	Well #1, 200'; #2, 1288'	R17252	11-03-80 02-09-81 03-16-81 06-16-81	2.5	Nil	1.7	<0.6

Table 33

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for August 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Monona	Clayton	Well #1, 840'	14980A	04-24-79 10-01-79 04-09-80 12-30-80	4.0	2	1.0	1.1
Pomeroy	Calhoun	Well #1, 150'	14986A	09-04-80 12-09-80 03-16-81 07-08-81	0.8	<0.7		
Rembrandt	Buena Vista	Well #1, 440'	14998A	04-30-79 11-16-79 04-23-80 12-11-80	9.4	16	0.8	1.8
Albion	Marshall	Finished water	15021A	05-07-79 11-19-79 04-08-80 12-15-80	2.3	2	0.1	<0.5
Paton	Greene	Well #1, 400'; #4, 460'	15049A	05-14-79 10-22-79 04-07-80 12-08-80	6.5	13	1.0	2.5
Irwin	Shelby	Well #4, 44'	15050A	05-14-79 11-19-79 04-07-80 12-16-80	2.1	5	0.2	1.8

Table 33 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for August 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Iowa City	Johnson	Well #1, 286'; Robert Kodros, Hilltop Mobile Home Park, Iowa City	15113A	09-29-80 01-15-81 04-20-81 07-21-81	<0.2	3		
Larchwood	Lyon	Well #3, 675'	15116A	06-04-79 09-25-79 05-13-80 12-15-80	5.4	21	1.2	3.7
Cedar Rapids	Linn	Well #1 & 2, 180'; Bob A. Bressler, Tower Terrace Mobile Home Court, Cedar Rapids, IA 52401	15143A	09-24-80 01-08-81 04-09-81 07-28-81	<0.2	9		
Coralville	Johnson	Well 250'; Betty Kline, Park Motel & Mobile Home Park, Hwy. 6 West, Coralville, IA 52241	15210A	06-04-79 10-15-79 04-08-80 01-06-81	3.6	7	1.9	0.9
Pilot Mound	Boone	Well #2, 25'	15260A	10-20-80 01-20-81 04-20-81 07-27-81	0.7	4		
Missouri Valley	Harrison	Well #1; Harold Deupree, Sunnyside Village Mobile Home Park, R.R. #3, Box D-1, Missouri Valley, IA 51555	15315A	10-08-80 01-12-81 04-09-81 07-22-81	2.2	7	1.0	1.0

Table 33 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for August 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Lansing	Allamakee	Well 250'	15336A	07-02-79 11-13-79 12-16-80	3.8	8	2.2	2.4
Denison	Crawford	Well 37'; Mrs. Carl H. Meyer, Meyer Mobile Home Park, R.R. #1, Denison, IA 51442	15381A	07-23-79 10-30-79 01-08-80 12-16-80	6.8	11	0.2	2.1
Donnellson	Lee	Well #4, 1850'	15593A	11-01-79 01-07-80 04-07-80 12-15-80	3.2	8	1.0	<0.6
Batavia	Jefferson	Well #1, 100'	15638A	11-13-79 02-27-80 09-16-80 01-07-81	2.8	6	0.3	<0.6
Keystone	Benton	Well #1, 1360'	15804A	01-28-80 04-30-80 10-22-80 01-20-81	2.1	13	0.2	<0.6
Shellsburg	Benton	Well #1, 440'; Harold Bickal, Rollin Homes Country Manor, Lot 20, Shellsburg, IA 52332	R15874	03-14-80 06-21-80 09-29-80 01-13-81	6.7	10	1.7	<0.6

Table 33 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for August 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Donahue	Scott	Finished water	R15886	03-11-80 06-26-80 10-09-80 01-28-81	5.3	3	1.0	<0.6
Latimer	Franklin	Well #2, 170'	R15899	03-10-80 06-06-80 09-08-80 12-08-80	2.7	<0.5	2.2	1.0
Ryan	Delaware	Finished water	R15903	03-14-80 06-25-80 09-22-80 12-26-80	2.3	6	0.3	1.0
Miles	Jackson	Well #1, 565'	R16045	04-15-80 07-16-80 10-15-80 01-20-81	7.7	12	2.3	<0.6
Dakota City	Humboldt	Well #3, 950'	R16067	04-03-80 07-07-80 10-07-80 01-13-81	2.3	6	0.2	1.0
Pioneer	Humboldt	Finished water	R16117	05-27-80 08-27-80 12-29-80 03-31-81	5.8	11	0.5	1.1

Table 33 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSI
SDWA SAMPLES

Data for August 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
* Walnut	Pottawattamie	Well #2, 2635'	R16366	05-12-80 08-12-80 11-12-80 02-17-81	17	46	5.7	2.4
Shelby	Shelby	Well #1, 2, 3, 4, 5, 50'	R16654	07-15-80 10-20-80 02-09-81 05-18-81	2.2	7	0.3	0.6
Moorhead	Monona	Well #2, 76'	R16667	07-14-80 10-20-80 02-03-81 05-04-81	2.0	7	<0.1	<0.5
* Bussey	Marion	Well #3, 2265'	R16721	07-28-80 11-04-80 02-17-81 05-18-81	8.0	37	7.5	1.3
Iowa City	Johnson	Well #1, 340'; Merle Aubrecht, Meadowbrook Estates Mobile Home Park, R.R. #4, Iowa City, IA	R16742	08-19-80 11-05-80 04-15-81 07-21-81	5.2	<0.4	1.4	1.0
Oskaloosa	Mahaska	Well #1 & 3, 40'; Michael D. Reynolds, Mahaska Rural Water, P.O. Box 235, 117 N. 1st, Oskaloosa, IA 52577	R16360	09-04-80 12-04-80 04-15-81 07-13-81	0.2	3		

Table 33 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for August 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Muscatine	Muscatine	Well #1, 275'; W. David Ripley, Clearview Mobile Home Park, R.R. #2, Muscatine, IA 52761	R16988	10-28-80 02-02-81 04-29-81 08-04-81	<0.2	<0.5		
LeGrand	Marshall	Finished water	R16997	10-01-80 01-13-81 04-15-81 07-20-81	5.6	12	2.1	0.6
Princeton	Scott	Well #1, 450'	R16999	09-29-80 01-19-81 04-13-81 07-13-81	<0.3	<0.5		
* New London	Henry	Well #2, 1870'	R17000	09-22-80 12-22-80 03-23-81 06-18-81	12	35	7.5	0.9
Templeton	Carroll	Finished water	R17005	09-22-80 12-29-80 03-30-81 07-27-81	2.8	1	0.4	1.3
Riverside	Washington	Well #6, 240'	R17011	09-29-80 01-13-81 04-09-81 07-10-81	1.4	3		

Table 33 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for August 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Marble Rock	Floyd	Well #1 North, 202'	R17016	09-30-80 01-28-81 04-20-81 07-29-81	2.1	<0.4	0.8	<0.6
Carlisle	Warren	Well #4, 5, 35'	R17055	10-01-80 01-13-81 04-20-81 07-28-81	0.7	4		
Garwin	Tama	Well #2, 169'	R17057	09-29-80 01-12-81 04-13-81 07-13-81	<0.3	7		
Columbus Junction	Louisa	Finished water	R17201	10-27-80 01-23-81 04-20-81 07-21-81	<0.2	3		
Fort Madison	Lee	Well #1, 156'	R17214	10-28-80 01-27-81 04-28-81 07-29-81	<0.2	4		
Earlville	Delaware	Well #2, 200'	R17253	11-03-80 02-02-81 04-28-81 07-27-81	<0.2	1		

Table 34

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
IOWA SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Merrill	Plymouth	Well #2, 43'	14875A	03-20-79 08-28-79 03-24-80 12-16-80	7.3	9	0.1	1.0
Galva	Ida	Well #2, 48'	15074A	09-15-80 01-05-81 04-06-81 07-14-81	3.4	5	<0.1	<0.6
Walbur	Carroll	Finished Water	15105A	09-16-80 12-29-80 04-21-81 08-18-81	0.7	2		
Waukee	Dallas	Well #2, 2750'	15190A	06-12-79 12-03-79 04-04-80 12-09-80	20	25	7.1	1.6
Adel	Dallas	Karen Smith, Dallas Co. Care Facility, R.R. #3, Adel, IA 50003	15237A	06-19-79 01-21-80 03-07-80 12-17-80	4.4	15	2.6	1.8
Deep River	Poweshiek	Well #1, 55'	15274A	06-18-79 03-03-80 12-12-80	2.4	4	0.2	0.7

Table 34 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Truro	Madison	Well 49'	15288A	09-17-80 12-29-80 04-20-81 07-29-81	0.4	<0.4		
Carson	Pottawattamie	Well 60'	15293A	06-25-79 12-10-79 02-26-80 12-22-80	6.7	6	0.1	<0.5
Henderson	Mills	Well #2, 60'	15294A	06-25-79 12-10-79 02-26-80 12-22-80	2.2	6	0.3	1.0
Mallard	Palo Alto	Well #4, 205'	15350A	07-09-79 10-03-79 04-07-80 12-24-80	2.6	5	0.5	0.8
Yale	Guthrie	Well #1, 83'	15368A	09-25-80 02-02-81 05-08-81 08-13-81	1.2	6		
Fairfax	Linn	William J. Faltis, Country Air Mobile Home Court, Highway 30 W., Fairfax, IA	15378A	07-17-79 10-17-79	2.4	Nil	0.7	1.9

Table 34 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Randolph	Fremont	Well #2, 60'	15395A	09-15-80 12-26-80 03-24-81 07-08-81	2.0	22	0.5	<0.6
Somers	Calhoun	Well #1, 410'	15524A	09-25-79 12-18-79 06-10-80 12-22-80	7.0	10	1.9	0.7
Blue Grass	Scott	Well #1, 550', Tom M. Telford, #6 Elmwood Dr., Hickory Hills, Blue Grass, IA 52726	15736A	10-07-80 01-13-81 04-15-81 07-14-81	2.4	3	0.4	<0.6
Ames	Story	Susan Flora, Homestead Mobile Home Park, #8 Homestead Colony, Ames,	15852A	10-20-80 01-27-81 04-28-81 08-25-81	0.9	<0.4		
Woodbine	Harrison	Finished Water	15895A	09-29-80 01-15-81 04-14-81 08-25-81	1.4	8		
Duncombe	Webster	Well #1, 974'	R15894	03-10-80 06-05-80 09-08-80 12-15-80	2.6	10	1.9	1.9

Table 34 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Woden	Hancock	Well #1, 536'	R15897	03-21-80 06-24-80 10-07-80 02-25-81	2.1	5	0.4	0.6
Oelwein	Fayette	Lake View Mobile Home Court, Howard Bly, City Park Road, P.O. Box 8, Oelwein, IA 50662	R16065	05-05-80 08-18-80 11-13-80 02-19-81	2.6	Nil	0.1	0.9
Oxford Junction	Jones	Well #1, 50'	R16070	04-29-80 08-11-80 11-24-80 02-23-81	2.9	<0.4	0.1	0.8
Aurelia	Cherokee	Well #3, 305'	R16256	04-25-80 07-28-80 10-23-80 02-02-81	4.2	4	0.2	<0.6
Dolliver	Emmet	Well #3, 205'	R16264	04-28-80 08-04-80 11-10-80 02-17-81	3.3	6	0.2	1.2
Elkader	Clayton	Finished Water	R16265	04-30-80 07-29-80 11-05-80 02-03-81	4.0	8	1.2	<0.5

Table 34 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Keosauqua	Van Buren	Well #1, 1831'	R16274	04-28-80 07-28-80 10-28-80 01-27-81	12	10	2.2	1.1
Thornton	Cerro Gordo	Well #1, 540'	R16317	04-30-80 07-28-80 10-27-80 01-27-81	2.9	11	1.5	<0.6
Correctionville	Woodbury	Well #1, 25'	R16666	07-28-80 12-31-80 04-13-81 08-10-81	0.6	8		
Truesdale	Buena Vista	Well #1, 442'	R16722	07-29-80 10-28-80 03-26-81 07-13-81	2.0	5	0.8	<0.6
Lynnville	Jasper	Finished Water	R16727	08-11-80 11-18-80 03-24-81 07-15-81	2.7	5	1.1	<0.6
Glidden	Carroll	Well #5, 156'	R16996	09-24-80 01-05-81 04-08-81 07-13-81	1.7	2		

Table 34 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Stockport	Van Buren	Well #1, 1880'	R17002	09-29-80 01-12-81 04-06-81 07-08-81	6.1	6	4.0	1.6
Pella	Marion	Finished Water	R17003	09-18-80 12-18-80 04-09-81 07-20-81	2.6	3	<0.1	<0.6
Geneva	Franklin	Well 160'	R17004	09-23-80 01-14-81 04-21-81 07-22-81	2.0	1	0.9	<0.6
Iowa Falls	Hardin	Finished Water	R17006	01-13-81 04-13-81 07-20-81	3.1	5	1.4	0.5
Montezuma	Poweshiek	Well 160', Ponderosa Utilities, Inc., Lake Ponderosa, R.R. #2, Montezuma, IA 50171	R17014	10-15-80 01-13-81 04-20-81 07-22-81	9.0	13	1.3	1.2
Delmar	Clinton	Well #1, 1300'	R17019	09-29-80 01-12-81 04-27-81 07-31-81	0.7	8		

Table 34 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Rinard	Calhoun	Well #I, 320'	R17056	10-07-80 01-13-81 04-07-81 07-08-81	<0.3	5		
Solon	Johnson	R. L. Stone, R.R. #4, Box 343K, Twin View Heights, Solon, IA 52333	R17060	10-13-80 01-12-81 04-06-81 07-12-81	6.5	4	0.9	<0.6
Dallas Center	Dallas	Finished Water	R17219	10-28-80 02-03-81 05-06-81 08-19-81	0.4	<0.4		
Storm Lake	Buena Vista	Finished Water	R17247	11-05-80 02-09-81 05-19-81 08-28-81	0.6	1		

Table 35

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA QUARTERLY RECHECK SAMPLES
Data for July 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Eldon	Wapello	Well #1, 1901'	R18241	06-08-81	6.8	3	2.4	<0.6
Sully	Jasper	Well #1, 2240'	R18242	06-22-81			5.8	0.7
Sergeant Bluff	Woodbury	Well #1, 456'	R18245	06-15-81			3.0	3.6
Wellsburg	Grundy	Well #1, 2050'	R18246	06-22-81			3.6	2.0
Sioux City	Woodbury	Spalding Plant	R18248	06-26-81			1.6	3.4
Sioux City	Woodbury	Zenith Plant	R18249	06-26-81			0.9	1.1
Leon	Decatur	Well #4, 2815'	R18254	06-15-81			5.0	2.7
Hardy	Humboldt	Well 90'	R18255	06-22-81			5.1	<0.6
Mason City	Cerro Gordo		R18369	07-13-81			3.8	1.9
Maurice	Sioux	Well #1, 520'; #2, 30'	R18374	07-10-81			1.3	2.8
Washington	Washington		R18375	07-13-81			5.0	1.2

Table 35 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
QUARTERLY RECHECK SAMPLES

Data for August 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Toledo	Tama	Well #8, 1950'	R18370	07-20-81			4.3	1.3
Remsen	Plymouth		R18371	08-11-81			0.5	1.1
Ankeny	Dallas	Well #1, 500'; #2, 600' Fox Creek Acres, Tom Thorpe, c/o Water Development Co., Box 98 Ankeny, IA 50021	R18372	07-14-81	12	<0.4	1.0	<0.6
Anamosa	Jones	Well #4, 450'	R18421	08-06-81			0.6	1.5
Bayard	Guthrie	Well #2, 109'	R18423	08-12-81			4.6	5.3
Earlham	Madison	Well #3, 2900'	R18424	08-10-81			7.9	2.1

Table 35 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
QUARTERLY RECHECK SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
What Cheer	Keokuk	Finished Water	R18367	07-24-81	19	22	6.6	<0.6
West Bend	Palo Alto	Well #4, 1360'	R18373	07-29-81	7.0	37	6.2	2.4
Marcus	Cherokee	Well #1, 1301'; #2, 880'	R18422	08-10-81	5.6	14	5.1	0.8
Nevada	Story	Well #3, 3340'; #4, 2630'	R18425	08-10-81			5.6	4.0
St. Paul	Lee	Well #1	R18428	08-17-81	8.9	9	4.0	1.3
Grand Junction	Greene	Well #1, 317'	R18430	08-17-81			0.6	<0.6
Eldon	Wapello	Well #1, 1901'	R18513	09-14-81			13.8	0.9

Table 36

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for July 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Dakota City	Humboldt	Well #2, 1025'	16936	03-09-81	3.0	6	1.4	
Barnes City	Poweshiek	Well #2, 400'	16947	03-12-81	5.4	8	3.9	
Harlan	Shelby	Well #23	16967	03-19-81	2.0	12	0.7	
Indianola	Warren	Well #1, 2600'	17019	04-09-81	3.3	13	3.8	
West Central RWA	Carroll	Well #1, 55'	17025	04-13-81	4.7	1	0.1	
Earlham	Dallas	Well #3, Jordan	17053	04-22-81	31	56	7.5	
Templeton	Carroll	Well #5, 820'	17057	04-23-81	8.4	23	1.8	
Dysart	Tama	Well #3	17096	05-06-81	3.0	13	2.7	
Tracy	Marion/Mahaska	Well #1, 154'	17142	06-02-81	0.2	5		
Ferguson	Marshall	Well #1	17152	06-03-81	3.1	6	1.4	
IGS & USGS		Well # WC-8, 210, FEE	17154	06-03-81	2.7	22		
Oskaloosa	Mahaska	Well #26	17159	06-09-81	1.4	7		
IGS & USGS		Well # WC-9, 141', FEE	17162	06-11-81	2.1	5		
Desoto	Dallas	Well #3	17164	06-11-81	0.4	1		
Van Meter	Dallas		17165	06-11-81	6.0	10	0.2	
IGS & USGS		Well # WC-10, 347'	17166	06-11-81	6.3	<0.5	0.4	

Table 37

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for September 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
State Center	Marshall	Finished Water, City Hall Jim Stricker, DEQ Region #5	R18188	05-07-81	$^{89\ 90}Sr$ <0.6	
IGS & USGS		Well #WC-14, 310'	17197	07-10-81	<0.2	9
IGS & USGS	Shelby	Well #WC-16, 140'	17210	07-30-81	1.1	2
Wilton Junction	Muscatine	Don Latta, Latta & Sons Well Drilling, R.R. #1 Riverside, IA 52327	17217	08-18-81	0.6	<0.4
Oelwein	Fayette	John Beckman, City Hall, Oelwein, IA	17220	08-22-81	1.9	5

Table 38

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
CONCENTRATIONS OF ^{90}Sr IN IOWA MILK SAMPLES

Data for 3rd Quarter 1981

TOWN	DATE OF SAMPLE	RADIATION NO.	^{90}Sr, pCi/l
Iowa City	07-07-81	R18376	2.6
Iowa City	07-21-81	R18401	2.2
LeMars	07-30-81	R18419	2.2
Iowa City	08-04-81	R18433	2.4
Iowa City	08-18-81	R18463	3.1
LeMars	08-14-81	R18466	1.2
Iowa City	09-01-81	R18498	2.3
Iowa City	09-15-81	R18546	3.0
Iowa City	09-30-81	R18567	2.2

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